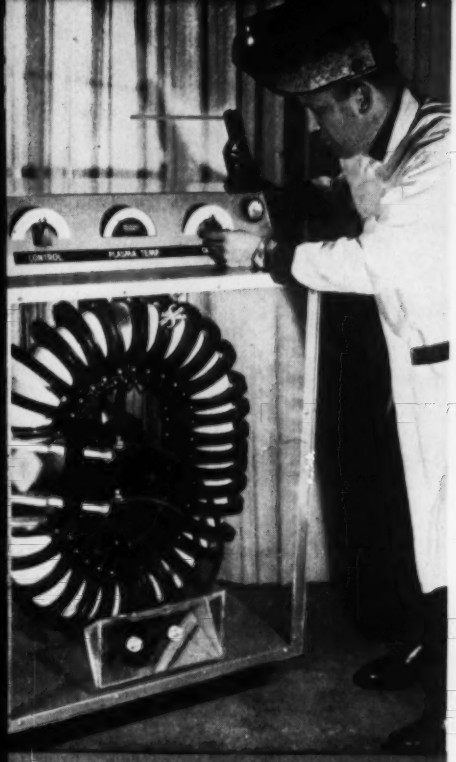
MARCH 30, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Welders Peek at Tomorrow

Visitors at next week's National Welding Exposition in Chicago will see this model of an atomic powered welding machine. It's an example of the kind of thinking that's broadening the industry's technological horizons. STEEL's editors asked more than a dozen authorities to give you a peek at what's being planned to make welding cheaper, better, and faster. The article is on Page 74

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Steel Industry Fiscally Strong, 34th Annual Analysis Shows

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Who Is Responsible for Getting More from Your Materials?

Page 111 . . .

Rail Market Steadies after Beating

How B&W JOB-MATCHED TUBING helps you make a better product

. . . The complete range of sizes and types of finish plus close tolerances provide freedom of design . . . *helps you make a better product.*

. . . Quality controlled from start to finish helps provide a wide range of end use possibilities . . . *helps you make a better product.*

. . . Controlled mechanical properties provide flexibility of design . . . *helps you make a better product.*

These are just some of the reasons why it pays to specify B&W Job-Matched Tubing.

Call your local B&W District Sales Specialist, or write for Bulletin TB-361 for full information. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W

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TUBULAR PRODUCTS DIVISION

TA-9027-G3

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Huge shaft to help make power hum

This forged generator shaft is a giant that will do a giant's work. At one of the great Northwestern dams it will take its place in the hydroelectric plant.

The big forging weighs 95 tons, is more than 33 ft long, and has a 15½-in. bore throughout its entire length. Made of carbon-vanadium steel, it was carefully heat-treated to produce the desired mechanical properties.

Huge shafts like this, and other high-tonnage items, are no strangers to the Bethlehem forge and machine shops. Yet Bethlehem forged products are not always king-size. We are equipped to handle all weights and shapes, from the real giants of the family to midget drop forgings.

Call us whenever we can be of service. No matter how complex your designs, Bethlehem technicians will meet all specifications. When Bethlehem does the job, you can be doubly sure of its quality.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

How COMMERCIAL'S "Die Bank" cut component unit cost from $8.49 to $2.59

Wheel covers are important components in the four-wheel drive, aircraft towing tractors manufactured by the American Coleman Company. Because the tractor's front and rear wheels are both steerable, a sturdy, dished-out, custom-produced cover was required to fully protect the wheel enclosed mechanism against possible damage from stones and debris.

Full consideration was first given to producing the covers as stampings. Low quantity requirements and the high cost of special tooling ($2,300), however, made the unit cost prohibitive.

The first wheel cover was finally produced as a machined, malleable iron casting at a unit cost of $8.49, plus a pattern charge involving $200. A unit cost reduction to $3.50, plus a $250 chuck cost, was later effected by hand spinning the covers.

Still seeking to reduce unit costs even further, American Coleman discovered and investigated COMMERCIAL'S "Die Bank" facilities.

The result: By using forming dies from COMMERCIAL'S "Die Bank" of almost 50,000 different die components, tooling costs amounted to just $80 —instead of the $2,300 originally estimated for new dies. The unit cost of each cover now custom stamped by COMMERCIAL is only $2.59.

For more complete information on COMMERCIAL'S "Die Bank" write to Commercial Shearing & Stamping Co., Dept L-14, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

SPECIALISTS IN THE SHAPE OF THINGS TO COME

The man with the HOBART ADI *has–*

7 greater profit opportunities

...immediately available from one machine

Switch to Inert Gas for welding Aluminum, Manganese, Titanium, Brass, Copper and Stainless. A special built-in high frequency stabilizer makes it easy.

INERT GAS WELDING
AC manual or automatic
DC manual or automatic
DC spot welding

Built-in Inert Gas facilities are protected by a hinged door and located at the bottom of the cabinet for convenience and safety. Either a hand or foot control can be used.

Switch to DC metal arc welding for easy vertical or overhead jobs . . . where operator preference calls for DC . . . and where accurate penetration control, or choice of electrodes requires DC.

DC METAL ARC WELDING

Where arc blow might be a factor or problem, switch to AC metal arc welding. You'll find the Hobart ADI lets you do high speed welding with large electrodes—resulting in lower production costs.

AC METAL ARC WELDING

You get more value in a Hobart ADI welder for these important reasons:

CURRENT CONTROL: Hobart's exclusive Multi-Range Switch and Rheostat provides a wide range of heat adjustments for AC, DC and Inert Gas welding.

REMOTE CONTROL: Permits operator to make fine adjustments at the work.

DIVERTER PATH DESIGN: Without "boosters" or extra "gadgets," the ADI provides easy arc striking, low spatter, and a smooth, stable arc.

LOW MAINTENANCE: A large down draft fan breathes fresh air free of dust and lint from the cabinet's upper sides and expels it at the bottom. Cores and coils are welded–remain quiet and assure excellent current adjustment, even after years of use.

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CO_2 Automatic Equipment with Beam Carriage

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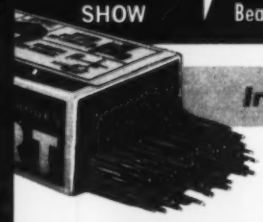
Handomatic Semi-automatic Submerged Arc Welding

Tig/Pak with gas drive for in-the-field welding

AC/DC Welder with Inert Gas Facilities

VISIT US AT
BOOTH 601
AWS WELDING SHOW
April 7, 8, 9
Int'l Amphitheater
Chicago, Ill.



Iron Powder ELECTRODES

Try the new Hobart Iron Powder Electrodes – keep pace with faster production and lower cost welding. They're specially designed for the "drag" technique.

HOBART BROTHERS COMPANY, BOX ST-39, TROY, OHIO
Please send me complete details on the items I've checked:

- ☐ ADI combination welder
- ☐ Standard Gas Drive
- ☐ "Husky Boy"
- ☐ "Contractor's Special"
- ☐ Standard Electric Drive
- ☐ Transformer
- ☐ Submerged Arc Heads

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*Address*_____

*City*_____ *Zone*____ *State*_____

GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
HYSUNITE Acid Hose
C
A
A Seamless tube of special synthetic rubber compound resists high concentrations of sulphuric, nitric and chromic acids at temperatures up to 100° F.
B Multiple plies of fabric reinforcement provide strength with maximum of flexibility
C Tough rubber cover resists abrasion and weather

Passes acid test—by more than 3 times

Unloading carloads of concentrated sulphuric acid proved a hose-killing job at this Gulf state fertilizer plant. Time after time, the acid charred the insides of a hose, making it brittle and easy to break. Even the best one could handle only 2,800 tons before it gave up the ghost.

Then the G.T.M.—Goodyear Technical Man—suggested HYSUNITE Hose. It's specially developed to carry highly oxidizing acids—even in high concentrations and at high temperatures hose could never before handle. How did HYSUNITE do there? *At last report, it had unloaded 9,900 tons. And it looks good for many more.*

Here's one more proof, then, that hose problems just don't come too tough for the G.T.M. Put him to the acid tests—no matter what your hose need—by contacting your Goodyear Distributor—or writing:

Goodyear, Industrial Products Division,
Akron 16, Ohio

HYSUNITE HOSE by

GOODYEAR

THE GREATEST NAME IN RUBBER

Hysunite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

This Week in STEEL

The Metalworking Weekly

March 30, 1959
Vol. 144 No. 13

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Purchase of company stock by employees helps to put labor and management on same team.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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behind the scenes

Power of Thought

At a distant time when muscles and corpuscles were things you simply took for granted, we were walking along a Mexican road, bound for a mountain village. During a rest period, an Indian gentleman offered us a lift in his ox-cart. Wooden wheels on a wooden axle stir up a terrible clamor, but in this instance it scarcely matched the uproar from the driver. Unlike the wheels, he was well oiled, and he had many interesting things to say, mostly at the top of his voice.

"Mark me, Senor, the time will come when men will not be obliged to haul things about behind these four legged brothers of the devil. Why shouldn't there be a big belt running from the top of this hill to the valley below? It could carry things I have to carry in this cart. Then, my friend, I could eat these cursed bulls, and enjoy a long siesta! Ole! It this not brilliant thinking? Have the goodness to pass that jug of pulque, and we'll drink to our belt conveyor!"

Notes on Belt Scoop

The idea of a belt conveyor has long been in the mind of man, and our pulque guzzling friend of yesteryear was original only in his attitude toward his bull team; most drivers cursed them, whereas he merely wished to eat them.

The notion of conveying bulk material is old hat in Ohio. Artists for Sunday supplements in this state used to go hog wild depicting conveyors running all over Ohio; in their drawings, coal, and iron ore, and scrap, and limestone, and all manner of products went sailing over the heads of awed bumpkins, while smiling tycoons pressed buttons in distant cities to activate the belts.

We give you this background because STEEL editors recently sniffed out a story about a multimillion dollar conveyor belt system proposed for Cleveland's industrial valley. It's designed to move 6000 tons of iron ore an hour from the lake shore to the mills. There wasn't enough verification at the time to warrant a complete story, but a mention was made in the Metalworking Outlook (Mar. 16, p. 54.)

When great steel corporations, railroads, and third parties representing $35 million wish to play it cozy, reporters can do little except to gnaw their nails. STEEL was sure of its story, but the Pennsylvania Railroad wasn't ready to reveal its part in it, and that left this worthy magazine up a tree because the most fascinating part of the whole deal was the fact that the Pennsy had quit fighting the belt, and joined it!

At 6 p.m. Mar. 18 the story was officially released, but STEEL went to press with it at 5 p.m. because that was the latest it could delay printing and still meet the postal deadline required for Monday delivery to all you delightful readers. The *Cleveland Plain Dealer* splashed the story all over Page 1 of its Mar. 19 issue, and to our knowledge it was the only publication that beat STEEL to the punch—although you could scarcely designate a weekly and a daily as journalistic competitors.

Today, on Page 46, the editors include a follow-up story on the conveyor belt. It contains more names, figures, and details, and aren't you glad that STEEL goes to so much bother to keep you informed?

Background Stuff

A word of explanation might be in order for those kind (and fortunate) souls who have never experienced the dubious pleasure of navigating Cleveland's kinky Cuyahoga River. The way things are now, iron ore moves up the river from Lake Erie in vessels not longer than 550 ft. A trip up and back consumes about 24 hours, and $2000 in operating expenses, so you can imagine the affection shipping and steel men are about to bestow on that ever-lovin' belt conveyor. The U. S. Army Corps of Engineers is interested, too, because those gallant seagoing sappers dredge the river each year to the tune of half a million dollars.

Beyond this, 550 footers are now rarities among the ore carriers. All vessels built for the lakes trade in recent years have been in the 700 ft class to conform with the St. Lawrence Seaway lock and depth specifications—and the only way to get a 700 footer up the Cuyahoga is to wait until the Greenland ice cap melts and puts Cleveland 30 ft under water.

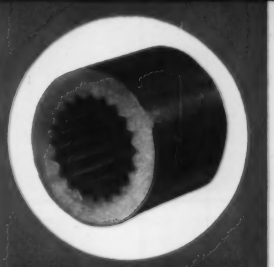
After the Cleveland belt conveyor is built and shows signs of returning the investment, you can look for a rash of belt construction all over the country. Think what this will mean to steel, rubber, paint, cement, mining—oh, well, you name it. Why, it might even bring about a new interest in travel. Some day somebody will make a deadhead trip from Cleveland to Pittsburgh on a rubber belt in company with prime hematite and return on a load of coal, but even after they drop the net on him the damage will have been done: Endless belts will lace the country in all directions, roads will revert to range, and railroads will sink into weedy jungles.

Shrdlu

(Metalworking Outlook—Page 31)

Another Meta-Dynamics Division development in

"Chipless machining"!



Ratchet
Material—AISI C-1020
Operation—Form I.D.
Production—300/hr.

Heat exchanger tubing
Material—Copper
Operation — Form fins
Production — 16″ of tubing formed per minute.

NEW CINCINNATI

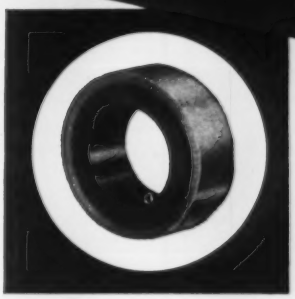
Intraform

Rapidly produces complex internal profiles to close tolerances, with low cost tooling.

This new *chipless machining* method makes possible low cost production of parts having intricate I.D. profiles that would be difficult or time consuming to machine by conventional methods.

Hollow cylindrical stock, ferrous or non-ferrous, with open or blind holes, is placed over a mandrel and "kneaded" by rapidly pulsating, rotating dies. The smooth, continuous kneading action redistributes the metal to reproduce the profile of the mandrel in the I.D. of the part. The work is formed to close tolerances and with fine surface finish. Tensile strength and hardness of the metal are also improved.

Work diameters ranging from ⅛″ to 5″ can be cold formed on standard Cincinnati Intraform machines, which can also be used for bonding laminated tubing and for reducing and tapering solid or tubular stock. For a description of the process and its many advantages, write for Bulletin M-2060, or call in a Meta-Dynamics Division field engineer.



Laminated tubing
Material — Aluminum and copper
Operation—Bond copper lining to aluminum tube
Production — 24″ of tubing bonded per minute.

Left photo shows workpiece prior to Intraform operation. Note mandrel in front of part. Right photo shows workpiece after Intraform operation with profile of the mandrel reproduced in I.D. As workpiece feeds and mandrel does not, only a short, relatively inexpensive mandrel is required. Time for this operation was 16 seconds.

Intraform

META-DYNAMICS DIVISION

Machines for Metal Forming and Heat Treating

THE CINCINNATI MILLING MACHINE CO.
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CINCINNATI

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Up to 10,000 psi
maximum pressure
Model PA-8

Up to 6,000 psi
maximum pressure
Model PE-5

Upto 3,050 psi
maximum pressure
Model PG-3

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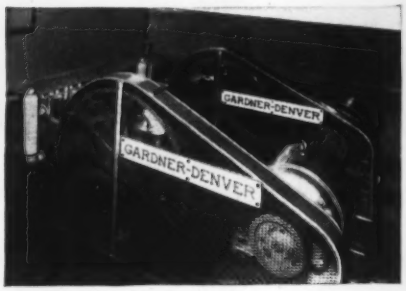

Two Gardner-Denver Model PG-3 triplex plunger pumps, pumping water at 1000 psi through hydraulic system to battery of permanent mold machines.

RESEARCH TAKES THE LONG VIEW

as Gardner-Denver engineers strive to improve existing products . . . to develop new ones to keep ahead of a fast-paced, rapidly growing industrial world.

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" WEIRKOTE'S® SOMETHING SPECIAL! IT CAN END THE NEED FOR ANY FURTHER CORROSION PROTECTION AFTER FABRICATION."

Q. You mean it? Weirkote can save you the cost of any further processing for corrosion protection after fabrication?

A. Absolutely. It's the continuous process that does it. Integrates the zinc to the steel so tightly there's never any peeling or flaking. No matter how severe the fabrication—any torture test you put it through—that bond stays put!

Q. Hmmm. Weirkote sounds great. One thing—is its zinc coating uniform throughout?

A. To the nth degree! Even the hardest-to-reach areas on the most complicated fabrications are completely protected.

Q. Corrosion-protected, you mean?

A. Corrosion-protected all over! So much so that you can work Weirkote to the very limits of the steel itself. So there you have it: stepped-up manufacturing efficiency, snarply curtailed manufacturing costs. All from Weirkote!

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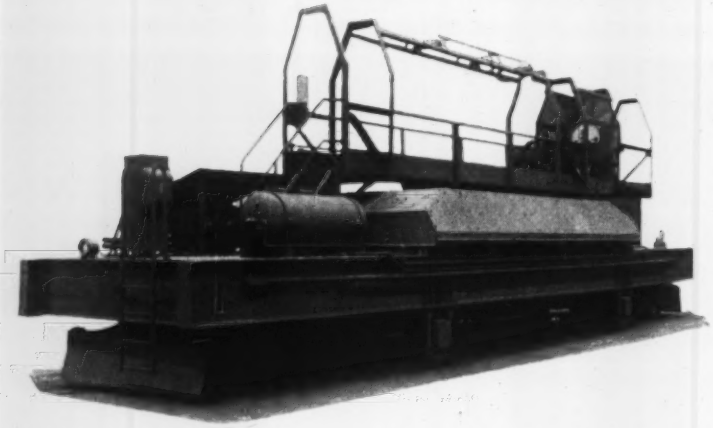
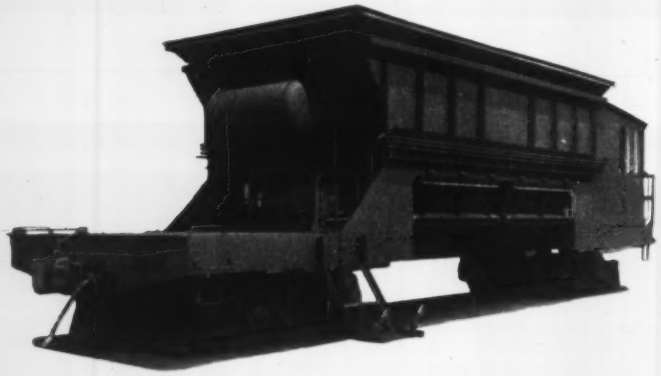


40-TON SCALE CAR
Double Hopper Bottom Dump



75-TON ORE TRANSFER
Gable Bottom Double Side Dump

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Perfect Editorial

Your editorial, "Dear Mr. McDonald: Why a Steel Strike?" (Feb. 23, p. 43), is perfect. I am instructing our director of personnel to have copies made and placed on the bulletin boards of both our plants.

My congratulations to you for clear and appropriate thinking.

J. R. Patterson
Vice President
Mackintosh-Hemphill Div.
E. W. Bliss Co.
Pittsburgh

Profile Interests Readers

I would like to obtain six copies of "Profile of Metalworking's Managers" (Feb. 16, p. 137). I am enrolled in a course on "Techniques of Supervision" at Northeastern University and plan to distribute these copies in my class.

All our management people find your publication interesting and helpful.

Harold M. Holgerson
President
Boston Marine Works Inc.
Boston

• • •

Will you please send me a reprint of this article? I found it exceedingly interesting.

John Gilroy
Plant Engineer
Harnischfeger Corp.
Milwaukee

• • •

Will you please send me a reprint of this informative article?

J. R. McQueen
Management Development
& Training Supervisor
Pickands Mather & Co.
Hoyt Lakes, Minn.

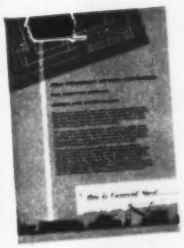
Requests Article for Customers

"Why Sheet, Strip Mix Is Changing" (Feb. 9, p. 108) was a good article. It seemed to touch most, if not all, the bases. It was objective enough so that even the "vanishing" stripmakers won't

(Please turn to Page 12)

... where industrial progress is cast in steel

APPLICATION ANALYSIS... AS YOU LIKE IT



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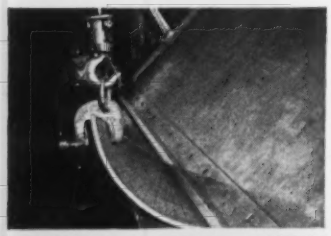
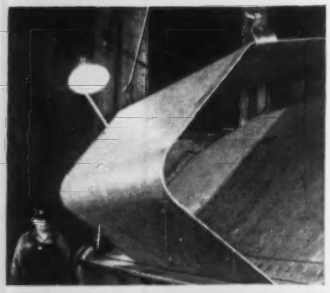
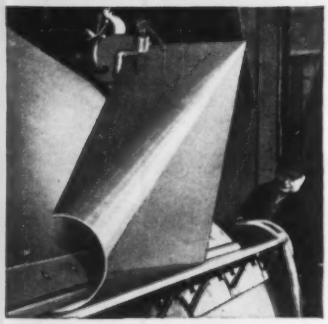


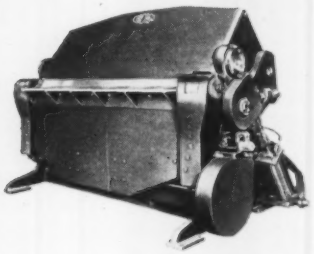




The accompanying illustrations give an idea of the versatility of the CHICAGO bending brake. No dies have to be changed or adjusted—no dies are used on these jobs. Yet, duplication is easily obtained on successive pieces. The machine is quickly adjustable for different thicknesses of material up to rated capacity. Automatic stop regulates the angle of bend. This, too, is adjustable to any degree of bend. The ease of changing from one job to another and the elimination of die costs make the CHICAGO bending brake the economical method for bending steel plates for weldments.

Many standard sizes are available with capacities for bending mild steel up to 12 feet by ¾ inch or 16 feet by ½ inch. Also many standard sizes in hand and power operated models for sheet metal.

BULLETIN P-55
This bulletin gives the details of how these and many other jobs are handled. Also complete description of the machine and specifications of the standard sizes.
Ask for a copy.



Front view of one of the heavy duty models of CHICAGO power bending brake showing the operation end of the machine.

Recommendations for any job on request.

6473

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side Presses • Press Brake Dies

Hand and Power Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7458 South Loomis Boulevard, Chicago 36, Illinois

LETTERS

(Concluded from Page 10)

heap abuse on your head for "preconceived editorial notions"!

Oddly enough, your observations are not too far different from what we have been stressing in our own AccuRolled strip advertising. We think it's a good enough article to spread among our customers and should-be customers.

May we reprint?

Herbert Appleby

Detroit Steel Corp.
Detroit

• *Permission granted.*

Management Articles Serve Firm

Will you please send us reprints of the three articles on salaries (Jan. 19, p. 42; Jan. 26, p. 52; Feb. 2, p. 60)? We would also like a reprint of "Incentives: Challenge to Managers" (Feb. 9, p. 52).

Your magazine is of great value to us, particularly in its type of management article, such as we request. It is in this field that it is of most service to our company.

Fred W. Schwarz

President
U. S. Semiconductor Products Inc.
Phoenix, Ariz.

Seeks Proper Credit

In Technical Outlook (Dec. 29, 1958, p. 57), you published an item, "Detecting Fatigue." It incorrectly credited the detection of early fatigue in aluminum alloys by ultrasonic methods to work done by Franklin Institute.

Franklin Institute has never actually made measurements which show what ultrasonic methods can do in connection with fatigue. Much work in this field was done in my laboratory at Brown University and the most recent work has been done under an Air Force contract at Wright-Patterson Air Force Base.

Rohn Truell

Director of Metals Research Laboratory
Professor of Applied Mathematics
Brown University
Providence, R. I.

Of Value to North Carolina

We would appreciate receiving a copy of "Facts & Figures of the Metalworking Industry" (Jan. 5, opposite p. 138). Because of the increased interest in our state in the metalworking field, we feel this publication will certainly prove to be of value.

Thomas B. Broughton

Development Engineer
Small Industries Section
State of North Carolina
Department of Conservation & Development
Raleigh, N. C.

Lockheed C-130 Hercules, Paradropping Heavy Cargo

Call your steel service center!

For production and maintenance, you can get La Salle cold-finished steel bars directly from your local steel service center—*when* you want them and in the grade, shape, and size you need. And you get them in *just a few hours.*

With steel bars available on the spot, your dollars are not tied up in large inventories. Valuable floor space can be put to more profitable use. And, if you wish, your steel service center will cut these bars to any length you specify.

Most steel service centers stock not only the standard line of La Salle cold-finished bars but also La Salle specialty steel bars—STRESSPROOF® and FATIGUE-PROOF®. The next time you need steel fast—call your steel service center.
Write for name of your local steel service center.

La Salle STEEL COMPANY
1414 150th Street • Hammond, Indiana

manufacturers of America's most complete line of cold-finished steel bars

AMERICAN STEEL WAREHOUSE ASS'N

CHATEAUGAY PIG IRON PROVES IDEAL BASE METAL FOR DUCTILE IRON DIESEL ENGINE PISTONS

Ductile iron diesel engine piston cast with Chateaugay Pig Iron by Hunt-Spiller Manufacturing Corporation, Boston, Massachusetts, is type 100-75-04 designating 100,000 psi minimum tensile strength, 75,000 psi minimum yield strength, and 4% minimum elongation.

Cutaway offers proof of fine uniform grain structure. The use of Chateaugay as the base metal for ductile iron results in economical machining, plus superior finish, tensile strength, yield strength, and elongation characteristics.

Mechanical strength, wear-resistance, heat-resistance, and minimum weight are the four primary factors influencing diesel engine piston design.

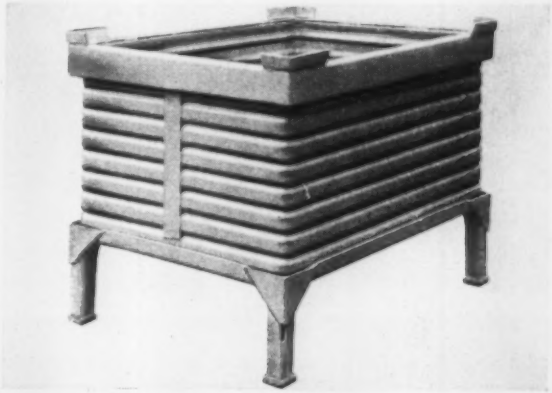
A fifth factor is cost. The piston must be designed so that it can be manufactured and sold at a reasonable price. It must be easy to cast and to machine.

Using Republic Chateaugay Pig Iron as the base metal, Hunt-Spiller Manufacturing Corporation has successfully met all of these requirements in developing ductile iron pistons as a replacement for aluminum. Tests, conducted under particularly severe service conditions by several major railroads, show the ductile iron pistons to have nearly double the service life of aluminum.

Chateaugay is perfectly suited for ductile iron use because of its high total carbon and unusually low phosphorus, silicon, and manganese content. Consistently uniform distribution of chemical elements in Chateaugay assists in producing a dense grain structure which results in excellent wear-resistance and economical machining.

The inherently excellent physical properties of Chateaugay are maintained in the ductile form assuring Hunt-Spiller of consistent benefits through its ability to fill adjoining light and heavy sections completely. This assures strong, flaw-free castings accurate to patterns and shapes.

Other superior characteristics of Chateaugay make it ideal for a wide variety of casting applications. A Republic Pig Iron Metallurgist will be happy to discuss these possibilities with you. There is no cost, no obligation for his services. Simply contact your Republic representative, or mail the coupon.



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REPUBLIC METALLURGICAL SERVICE provides a solid foundation for industry's most complete line of merchant pig iron. Republic offers expert metallurgical service to assist you in selection, application, and processing. The Republic Pig Iron Metallurgists are both foundrymen and skilled technicians. They have at their fingertips information on the latest processes and techniques available for improving castings, and expanding their use and sale. Mail the coupon for this obligation-free service.

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World's Widest Range of Standard Steels and Steel Products

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Send more information on:
☐ Chateaugay Pig Iron ☐ High Strength Boxes

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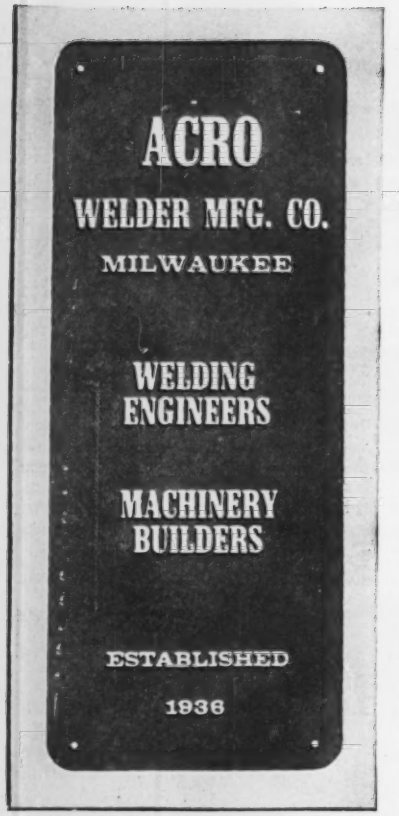

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Continuous "torture" seam from Bethcon sheet

In fabricating spiral conduit, Carrier Corporation puts our Bethcon continuously galvanized sheet through a torture which can be survived only by steel sheet of the finest working quality.

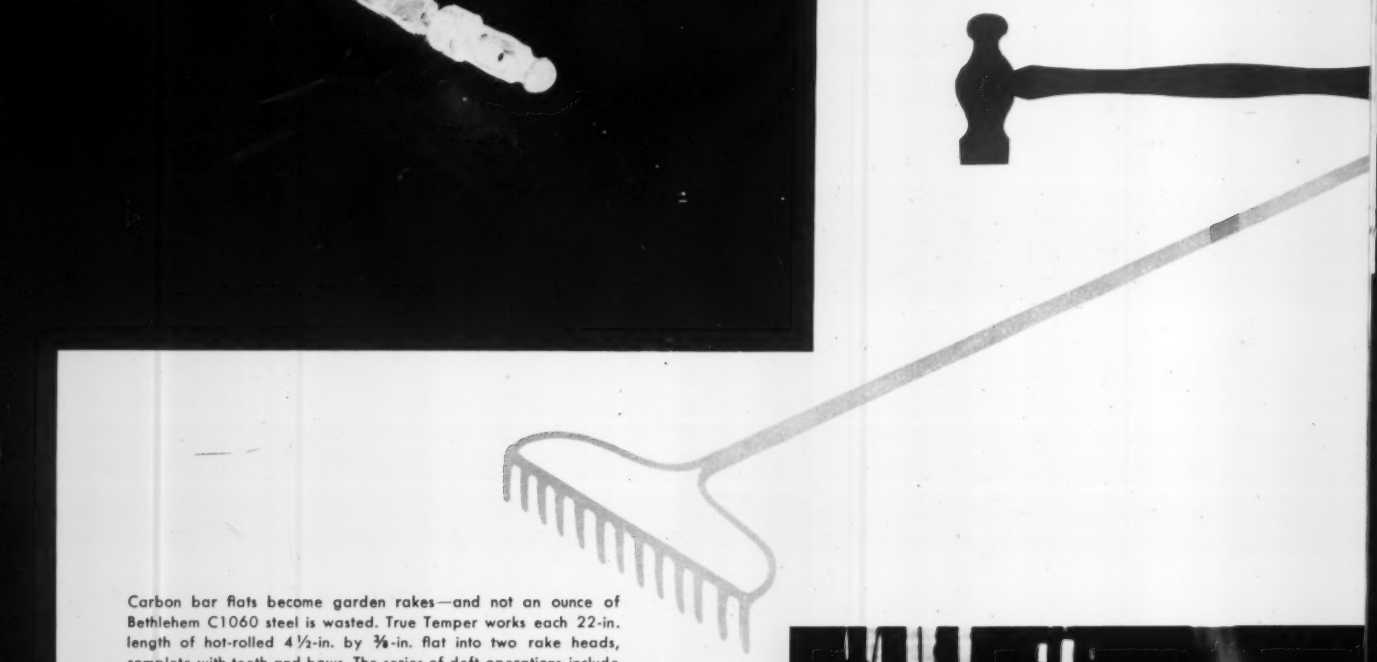
As the coiled ribbon of steel is fed through the forming rolls of the spiral conduit machine, each edge is bent back, interlocked with the edge of the preceding convolution, and pressed flat. The resulting seam is airtight, helps make the duct rigid, and provides a smooth interior surface.

BETHLEHEM STEEL

This seaming process requires a precision of bends and angles which demands a high degree of uniformity in the sheets. No cracking of the galvanized coating can be tolerated. Bethcon meets these requirements for Carrier—and it can meet yours as well. For full details, phone or write the nearest Bethlehem sales office.

Bethlehem engineers will help you with your steelworking problems

Stanley Tool's "Jobmaster" ball peins begin as hot-rolled 1 ¼-in. square bars of Bethlehem C1078 forging-quality steel. After drop-forging, they are annealed, drilled, ground, polished, and stamped. Prior to polishing, a series of heat-treatment operations is performed to procure a properly heat-treated tool: the rim of its striking face is induction-tempered to minimize chipping. Result: quality hammers, made from top-quality Bethlehem Steel bars.



Carbon bar flats become garden rakes—and not an ounce of Bethlehem C1060 steel is wasted. True Temper works each 22-in. length of hot-rolled 4½-in. by ⅜-in. flat into two rake heads, complete with teeth and bows. The series of deft operations include blanking, roll-forgings, hot-bendings, grinding, press-forging, and tempering—a lot of processing for one piece of steel. Only quality steel, like Bethlehem carbon bars, will do the job.

The first press-forging doesn't look much like a spading fork, but that's the first step at Union Fork & Hoe. The pattern shown is forged from a hot-rolled 4 ¼-in. by ½-in. carbon bar of Bethlehem C1095 steel. Next, the "fingers" are rolled into a diamond-back shape, and the two outer tines are turned 180 degrees. After heat-treating, shot-peening, and polishing, the quality bar has become a quality garden tool, ready for heavy duty.

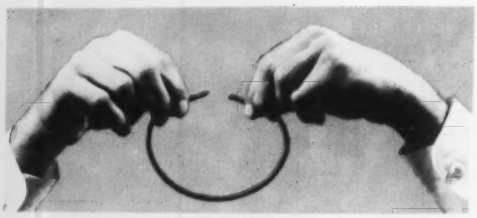
BETHLEHEM STEEL

Cut Shapes Trim Costs — This blank will be formed and welded into a complete housing for a truck axle. The fabricator needs no cutting equipment. He'll have a minimum of scrap to handle—and to pay freight on. His job time will be cut to the bone.

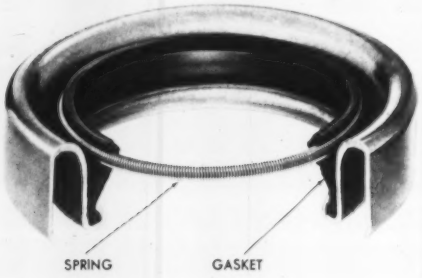
Cut shapes save space, time, money. Our facilities allow us to make as wide a range of cut shapes as you'll find anywhere. We've been able to help many fabricators save money. One of our technical men will be glad to give you all the facts. Just give our nearest sales office a call.

BETHLEHEM STEEL

Sealing a shaft with coiled spring wire



The diminishing helix on one end threads into the other end to form a smooth, strong connection.



Simple type of oil seal

Here's a coiled spring which locks itself into a perfect circle. Its job: to provide 360 degrees of even pressure against a shaft gasket, preventing oil leakage.

For this oil seal retaining spring, Bethlehem spring wire consistently meets the all-important requirement of uniformity. It's just one of the many grades of spring wire which we regularly furnish.

We make just about every kind of steel wire. We draw it as fine as 40 ga and with any suitable wet- or dry-drawn finish. In special shapes, too, and for special purposes, such as cold-heading. We'll be glad to tell you more about Bethlehem wire. Just use the coupon below.

Bethlehem Steels and Specialties

Here is a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded carbon and alloy steels
Special rolled sections

TOOL STEELS:
A grade for every job

FORGINGS: Drop, press, hammer, and upsetter
Rolled-and-forged special sections

SHEETS: Hot- and cold-rolled
Continuously galvanized

TIN MILL PRODUCTS: Electrolytic and hot-dip tin plate; black plate

PLATES: Universal and sheared

ROD AND WIRE: General and special-purpose types
Fine and shaped wire

WIRE ROPE AND SLINGS

FASTENERS: Standard bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous buttweld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS: Frames, tanks, housings, vessels

RAILS: Tee, crane, girder

CASTINGS: Carbon, alloy, and stainless steel
Grey iron; brass and bronze

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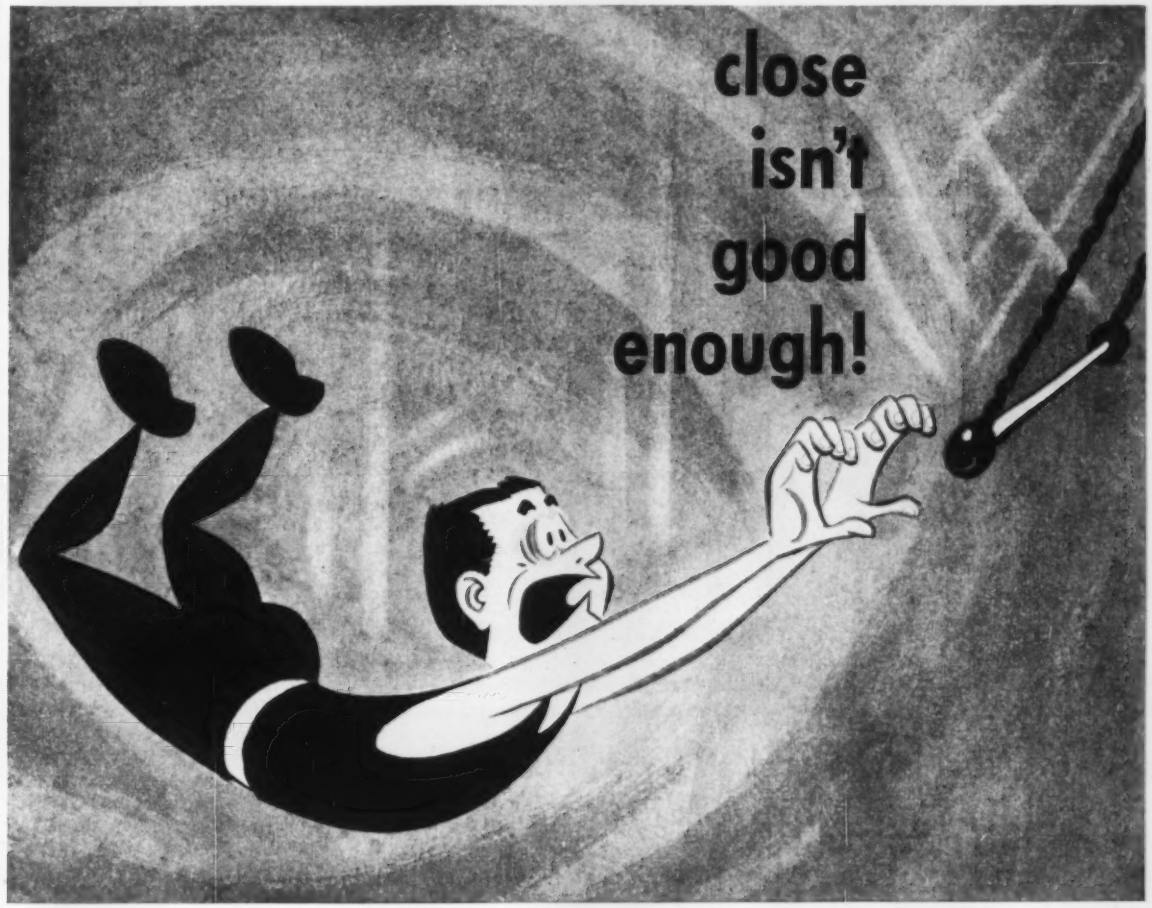
BETHLEHEM STEEL



How close do you specify balancing tolerances for your rotating parts? Are they close enough? Can your balancing equipment meet them accurately, quickly, or do you depend on your operator's judgment? It's worth knowing because it costs far less to balance precisely than to correct product failures and regain lost customer confidence once a breakdown occurs "in the field."

In balancing, either it's right or it isn't. For example, consider the accuracy of angular location of unbalance. You make the right *amount* of correction—but place it only 5° off the required location and you still have 9% of the original unbalance left. This means vibration—and eventual trouble.

Gisholt Balancers assure you of highest accuracy in locating and measuring unbalance, enable you to correct in smaller increments—in both single and/or two-plane balancing operations. And they do it faster, easier, using unskilled personnel.

Test before you buy. To help you *specify* the balancing equipment best suited to your needs, Gisholt offers a new booklet, "Performance Tests for Balancing Machines." No *reliable* supplier of balancing machines will refuse to cooperate in these tests. For your free copy, call your Gisholt Representative or write us.

This Gisholt 1S Balancer is used to locate and measure unbalance in Dynamotor armatures. The direct reading amount meter is calibrated so that one meter unit equals 1/16" length of 1/16" diameter solder. Work is corrected in left and right correction planes, using simple soldering iron, and rotated again to inspect for balance. Production—by the female operator shown—over 40 parts per hour.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Machines •
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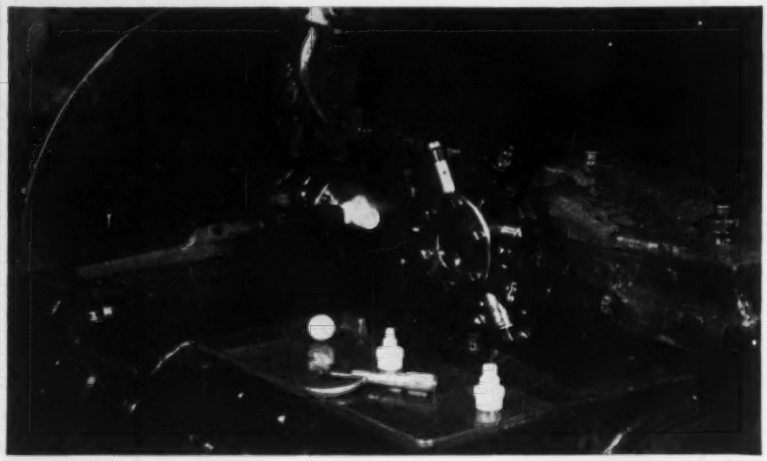
Lubrication



SPECIALLY TRAINED OPERATORS now machine "Teflon" to tolerances of .001" with Texaco Cleartex BX.

ANSWER TO "TEFLON" MACHINING PROBLEM FOUND BY THROWING OUT STANDARD CUTTING TECHNIQUES

DuPont's new thermoplastic, "Teflon" (or, more precisely, Polytetrafluoroethylene resin) has a combination of properties which makes it uniquely advantageous in a number of applications.

They also make it uniquely difficult to machine.

Unlike other thermoplastics, "Teflon" does not flow well in its melted state. This, plus the fact that the molding process requires extremely high temperatures, makes molding to close tolerances difficult. "Teflon" must be machined from rod stock when tolerance is a critical factor.

Special machining problems. Standard cutting techniques cannot be applied to "Teflon" machining, according to Mr. S. Mulay, President of Tri-Point Plastics, Inc., Albertson, N. Y. His firm, which specializes in working DuPont's new product, had to invent new cutting techniques and retrain operators to cope with "Teflon's" special characteristics. In spite of these steps, the materials–tools and lubricants–used in the machining process still gave Tri-Point trouble.

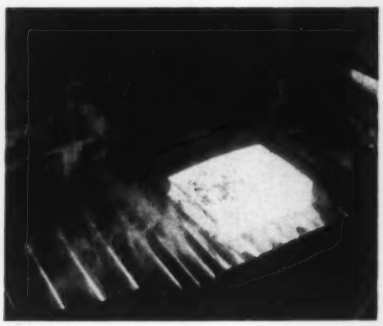
Cutting oil a critical factor. It soon became obvious that standard cutting oils used for ordinary metalworking were not adequate for "Teflon" machining. Although "Teflon" is not an abrasive material, its very low thermal conductivity coupled with its high heat resistance tended to shorten tool life by actually burning cutting edges. These high temperatures also warped the machined part, making close tolerances almost impossible. Finally, "Teflon's" white color made it extremely difficult to see the work through soluble oil emulsions–which otherwise might have solved the problem.

Tri-Point calls in Texaco. At this stage Tri-Point turned to the expert – a Texaco Lubrication Engineer. He outlined the need: a transparent cutting oil with the ability to remove the maximum amount of heat. After considerable study and testing, he recommended switching to Cleartex BX whose characteristics seemed precisely to fit the situation. His choice has proved to be right. Now Tri-Point uses this oil exclusively, with excellent results. Tool replacement has dropped significantly, and Tri-Point can count on maintaining "Teflon" tolerances of .001".

Pressure plus heat presents two-way lubrication problem

There is a definitely established trend today toward higher and higher temperatures in industrial processes in almost every type of industry. Mill rolls, plastic extruding machines and steam joints are only a few of the many applications which now involve temperatures well over 300° F. combined with high pressures. This combination has presented a severe lubrication problem – particularly in grease-lubricated equipment.

Nature of grease creates problem. As temperature rises, the consistency of grease decreases – most greases become virtually useless at temperatures above 350°. Furthermore, high heat will usually cause rapid oxidation and deterioration in a relatively short time.



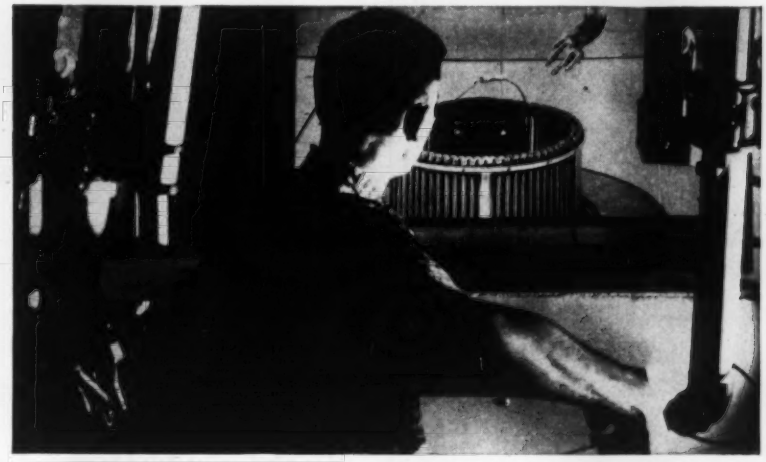
Unique new grease resists both forces. Texaco has now developed a new product whose remarkable performance in two years of field tests seems to answer the problems of *both* high heat *and* extreme pressure–Thermatex EP-1.

Thermatex is unique in its high resistance to both these forces.

Protects 400° equipment for two years. Thermatex has been field-tested for two years as the lubricant for steam joints in a paper mill. Previous products used had solidified and coked after two weeks of exposure to the extreme pressures and 400° F. heat, causing failure of the joint. Thermatex, on the other hand, has kept the steam joints operating without failures–and without significant wear–for two years.

news

TEXACO REG. T.M.



GAMMA-RAY "HOT CELL" AT BEACON contains radioactive Cobalt-60.

Nuclear energy harnessed to crack the secret of better lubricants

Lubricants finer than the ones available from even the most advanced standard refining techniques will soon be produced by Texaco—with the help of nuclear radiation. Completely *new* lubricants are a real possibility, too – lubricants with atomic structures stronger and more cohesive than anything now available.

To open up this new frontier in lubrication, Texaco has assembled the most fully equipped nuclear laboratory in American industry. Texaco scientists have been put in command of all four basic irradiation forces—electrons, positive ions, gamma rays and neutrons—and are now probing the activity of hydrocarbon molecules during refining.

In addition to the Cobalt-60—rated at 29,000 curies – Texaco scientists have at their disposal a 6- to 10-million electron volt linear accelerator and a 3-million electron volt positive-ion Van de Graaff generator. The linear accelerator, or "electron gun," was especially designed and built for Texaco and is probably the only nuclear instrument of its kind now in use by a commercial firm for its own fundamental research.

Searching analysis of deposit problems

The January 1959 issue of *Lubrication Magazine* is entirely devoted to deposit problems—their causes, prevention and solutions. This article should be of vital concern to every engineer who has to cope with this often-costly lubrication problem. See coupon.

TUNE IN...Metropolitan Opera Radio Broadcasts Every Saturday Afternoon

MOVIE OF THE MONTH

★★ SEE! ★★

"HYDRAULICS"

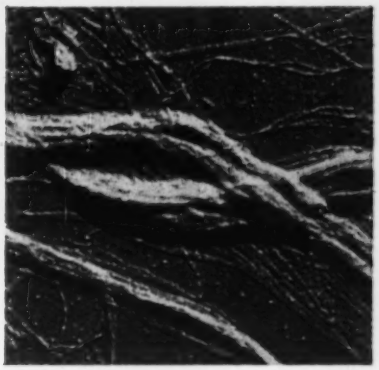
"One of the year's most informative movies!"

—Paul Rolnick, Editor, *Applied Hydraulics*

NEW PRODUCT NEWS

Nondrying protective coating keeps parts free from rust and corrosion for as long as a month during inter-process handling, storage, and shipment: *Texaco 564 Rustproof Oil.*

New, easy-to-apply gear lubricants won't drip in hot weather or flake off in cold – are ideal for many open-gear applications: *Texaco Geartac.*



How working splits grease fibers.

80,000x electron microscope explores grease structures

One of the most important tools of research, the electron microscope, is helping in the development of new and better greases. By understanding the nature of grease structures and their reaction to various conditions, Texaco scientists can create greases that are suitable for many different purposes.

THE TEXAS COMPANY, Dept. S-LN-11
135 East 42nd Street
New York 17, New York

Dear Sirs:

☐ I am interested in seeing "HYDRAULICS"

I would like a free copy of

☐ Lubrication Magazine – January issue

☐ Management Practices that Control Costs via Organized Lubrication

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Firm_____

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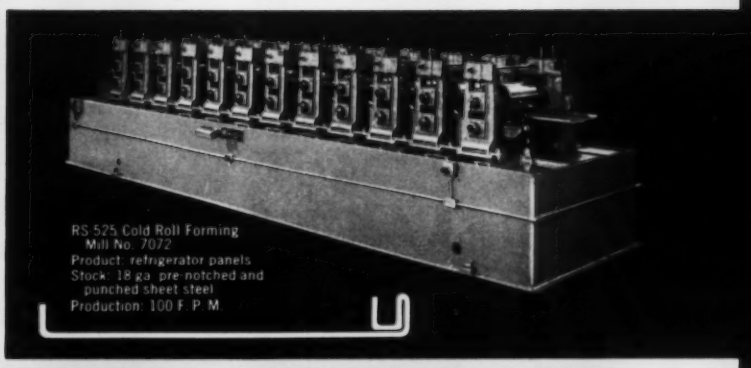
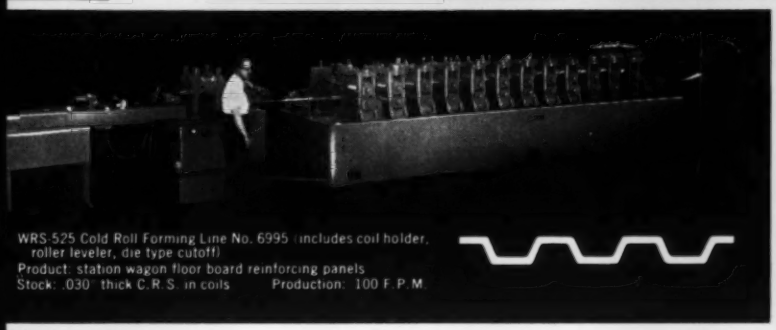
Roll forming upswing.....

Recently installed in the plant of one of America's leading steel companies was this McKay cold roll forming line for the forming and cutting to length of industrial shelving angles up to .116" mild steel strip with pre-notched holes for joining. Line is composed of double rotating coil holder, roller leveler, pre-notching press, forming machine, cut-off, run-out and kick-off table.

Completely Automatic Rim Rolling Line No. 6798
Product: automobile and farm implement drop center wheel rims
Stock: welded steel bands
Production: 600-900 Rims per hour



RS-525 Cold Roll Forming Mill No. 7072
Product: refrigerator panels
Stock: 18 ga. pre-notched and punched sheet steel
Production: 100 F. P. M.



WRS-525 Cold Roll Forming Line No. 6995 (includes coil holder, roller leveler, die type cutoff)
Product: station wagon floor board reinforcing panels
Stock: .030" thick C. R. S. in coils Production: 100 F. P. M.

WRS-653 Cold Roll Forming Line No. 7229 (4) (includes coil holder, roller leveler, die type cutoff)
Product: bar joist channels
Stock: ⅛" to ¼" thick h. r. low carbon steel in coils
Production: 100 F. P. M.

WRS-420 Cold Roll Forming Line No. 7118 (includes coil holder, roller leveler, pre-notching press, die type cutoff)
Product: structural angles and channels
Stock: 16 ga. to 11 ga. h. r. and c. r. low C steel in coils
Production: 100 F. P. M.

Manufacturers of all kinds of products look to McKay Machine for roll forming equipment to lower man-hour costs!

To increase man-hour production, manufacturers are turning to the automated roll forming line. In recent years McKay Machine engineers have developed equipment that enables fabricators to produce more and more products in a continuous stream directly from coiled stock.

From drop center wheel rims and station wagon floor boards to finished refrigerator parts, manufacturers are finding roll forming gives them greater production control and product uniformity while eliminating many costly intermediate manufacturing functions.

Analyze your production—there may be a way you can take advantage of roll forming economies. To help you, why not rely on the 20 years of roll forming leadership of the *McKay Machine Company, Youngstown, Ohio.*

McKAY McK MACHINE

✻"A METALWORKING PROFILE"

modernization turns tough job into easy routine!

Modernization . . . that's the key to saving money! For example, a Chicago foundry recognized they had a handling problem—tapped Whiting's know-how and installed a Whiting Tiger Crane created for the job, to get their required production boost. Now, foundry officials report more efficient hot-metal handling at lowest cost.

What Whiting did for this plant can be done for you! Send for "Metalworking Profiles," a colorful new booklet of performance reports that shows Cranes and other Whiting equipment on the job . . . stepping in to save money for leaders in the metalworking industries. *Whiting Corporation 15643 Lathrop Avenue, Harvey, Illinois.*

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MANUFACTURERS OF CRANES: TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

CALENDAR
OF MEETINGS

Mar. 31-Apr. 3, Society of Automotive Engineers: National aeronautic meeting and production forum, and aircraft engineering display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Apr. 1-2, National Industrial Conference Board Inc.: General session for all associates, Ambassador Hotel, Los Angeles. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Apr. 1-3, Gas Appliance Manufacturers Association: Annual meeting, Americana Hotel, Miami Beach, Fla. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: Harold Massey.

Apr. 2-3, Metallurgical Society of AIME: Conference on physical metallurgy of stress-corrosion fracture, Mellon Institute, Pittsburgh. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Apr. 5-8, National Association of Waste Material Dealers Inc.: Annual convention, Edgewater Beach Hotel, Chicago. Association's address: 271 Madison Ave., New York 16, N. Y. Managing director: Clinton M. White.

Apr. 5-10, American Chemical Society: Annual meeting, Boston. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Apr. 5-10, Nuclear Congress and Atomfair: Public Auditorium, Cleveland. Coordinator: Engineers Joint Council, 29 W. 39th St., New York 18, N. Y. Secretary: E. Paul Lange.

Apr. 6-8, American Hot Dip Galvanizers Association Inc.: Annual meeting, Empress Hotel, Miami Beach, Fla. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Apr. 6-8, Metallurgical Society of AIME: Annual conference of the national open hearth steel committee and the blast furnace, coke oven, and raw materials committee, Sheraton-Jefferson Hotel, St. Louis. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Apr. 7-8, Building Research Institute: Annual meeting, Penn-Sheraton Hotel, Pittsburgh. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Technical secretary: Harold Horowitz.

Apr. 8-10, National Industrial Conference Board Inc.: Annual conference on atomic energy in industry, Hotel Statler-Hilton, Cleveland. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

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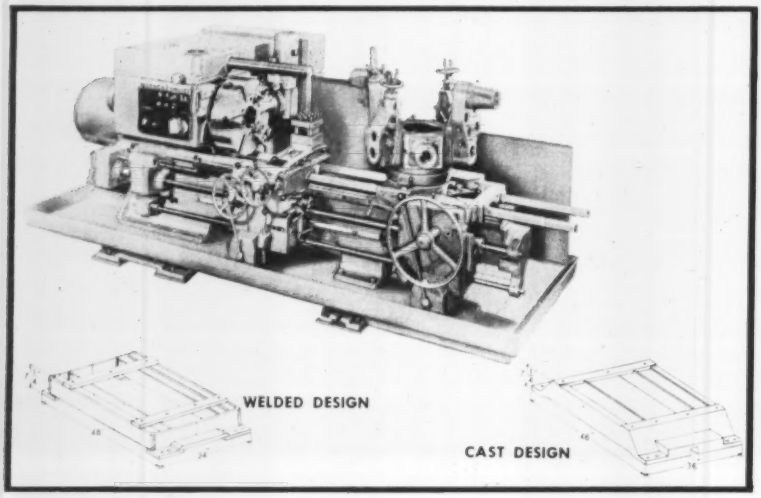
WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS



WELDED STEEL LATHE LEGS ELIMINATE BREAKAGE... REDUCE COSTS 49%

Cast head and foot legs on heavy duty turret lathes built by Warner and Swasey Company, Cleveland, Ohio, were being damaged occasionally by shipping mishaps. It was decided that they be strengthened. Normally this would have meant a 15 to 20% increase in casting costs not figuring pattern changes. At this point, fabricating the legs of formed, welded steel shapes was checked.

With steel design, it became possible to increase strength even though wall thickness was reduced. This reduction in wall size is possible because steel is stronger and more rigid than cast iron. Resultant savings in material weight, when added to savings in cost per pound of steel over cast iron amounted to 49% of the original cost of the cast legs. And when compared to the estimates for the strengthened cast design, a cost saving closer to 60% was realized. The welded legs now have superior resistance to shock and impact loads encountered in shipping and implacing.

DESIGN IDEA SHEETS FREE TO ENGINEERS

Practical tips for achieving efficient welded designs are published regularly by The Lincoln Electric Company in "Design Ideas". They are sent free of charge to design engineers, executives and production supervisory personnel.

The "Procedure Handbook of Arc Welding Design and Practice" has 1100 pages and 1300 illustrations. 245 pages are devoted to machine design. Price is $3.00 postpaid in the U.S.A., $3.50 elsewhere. Order from The Lincoln Electric Company, Box 3115, Cleveland 17, Ohio.

A new publication entitled "Arc Welding in Machinery Design and Manufacture" is a practical reference manual of ideas for the efficient use of steel in machine design. Order this book from the James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio. Price is $2.00 in U.S.A., $2.50 elsewhere, postpaid.

MACHINE DESIGN SEMINARS

Already attended by hundreds of design engineers, Lincoln Machine Design Seminars continue to be fully attended by designers interested in the latest information on welded design.

Conducted regularly at the Lincoln plant in Cleveland, Ohio, the seminars run for five days. During that time the "student" engineers learn new design techniques for achieving the most efficient designs for machinery and components. They witness demonstrations of latest welding processes and techniques.

"Alumni" of the Lincoln Seminars are enthusiastic in their commendation of these sessions for practicality and usefulness.

Engineers who desire to attend a Machine Design Seminar should write to R. Wilson, The Lincoln Electric Company, Cleveland 17, Ohio. Attendance is by reservation.

THE LINCOLN ELECTRIC COMPANY

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The World's Largest Manufacturer of Arc Welding Equipment

Advantages for You

A few of the thousands of high-quality items made from superior Roebling cold rolled steel.

IT ALL COMES DOWN to one fact...that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered, scaleless tempered, tempered and polished, blued or strawed.

You pay for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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Branch Offices in Principal Cities
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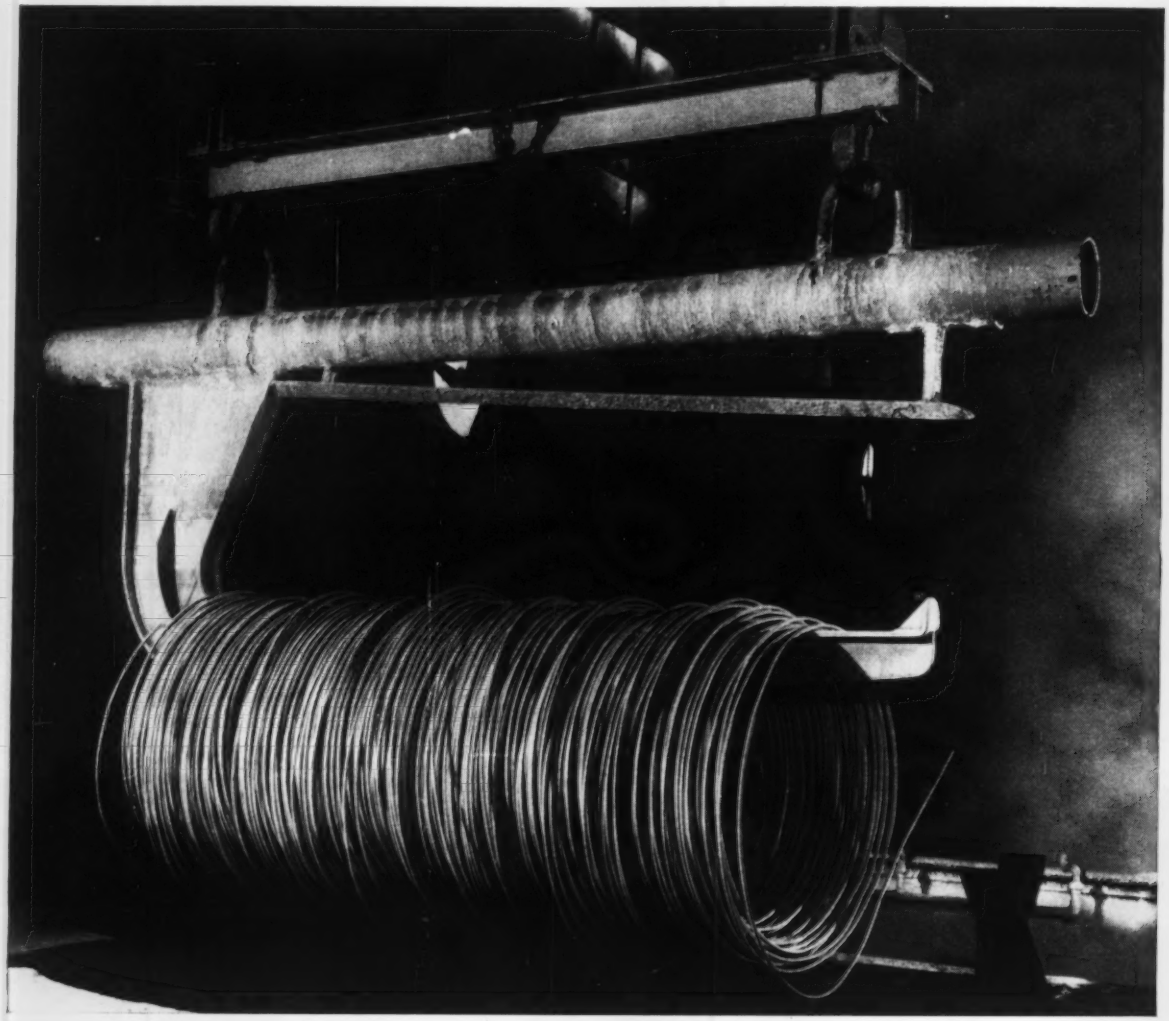
Roebling... Your Product is Better for it

PHOTO BY MCMANUS



Closeup of a Monel pickling hook in the Wire Draw Department, the Timken Roller Bearing Co., Gambrinus Plant, Canton, Ohio. Pickling is in sulphuric acid up to 16%, at 180° F. Loads vary from 1700 to 2700 pounds.

9 years of acid service...
This Monel hook looks as good as new!

See this hook? For 9 years it's been dipping wire into sulphuric acid solution – no repairs, no letup.

When the Timken Company started up this pickling line in 1949, specifying engineers wanted pickling hooks made of a strong, acid resisting metal. They chose Monel* nickel-copper alloy. It has excellent corrosion resistance – can't weaken by dezincifying.

This fabricated hook will last a lot longer, too

It's stronger than structural steel. If damaged, it's economically repaired.

Monel alloy saves replacements in other pickling equipment, too. In slings, baskets, chains, tie rods, Monel alloy's unique combination of corrosion resistance ... strength ... ductility ... easy welding ... really pays off.

You'll find a lot of useful information about Monel alloy pickling equipment in the illustrated handbook, "Equipping the Pickle House for Greater Production at Lower Cost." Write for it. *Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.

INCO NICKEL ALLOYS

Steel Industry Financially Strong Despite Recession

Despite a 31 per cent decline in net profits and a 21 per cent drop in sales, the financial position of the steel industry was basically sound as it entered 1959. Working capital of the 33 companies participating in STEEL's 34th Financial Analysis of the steel industry was at an all-time high of $3.36 billion. Total assets were up 4 per cent (Opposite Page 50).

Eisenhower Wants Stable Steel Prices

Though his administration has usually kept out of specific collective bargaining negotiations, President Eisenhower says that as a measure of statesmanship he would like to see that no steel price increases occur. "While the steel negotiations are basically a matter for the companies and the union," the President says, "the whole public is concerned." If we are to maintain the methods of a free economy, he adds, the steel negotiations must be conducted in such a way that prices should not be compelled to go up.

Lead, Zinc in Modest Recovery

Lead and zinc were harder hit during the recession than most other metals, but a STEEL survey shows they'll be making a comeback this year. Expectations are for a 10 per cent gain in slab zinc consumption over 1958's, but it still will not top the 1957 figure. Lead consumption should gain 5 to 10 per cent over 1958, still not as good as in 1957. For what you can expect over the rest of the year in the way of prices, production, consumption, new and improved uses, see Page 39.

Steel Inventory Buildup Falters

Steel users are having difficulty in building up inventories to tide them over the anticipated summer steel strike. The reason: Current operations are taking incoming steel shipments as fast as they are received. Mill spokes-

men now predict the total inventory accumulation by July 1 will be substantially less than consumers planned.

Cleveland Ore Conveyor Means Sales, Savings

The proposal to build an ore carrying conveyor belt to bypass the Cuyahoga River at Cleveland can mean $35 million in hardware contracts to the conveyor industry. Lake carriers can save $1.8 million by eliminating the river trip. Belt talk has renewed speculation about a conveyor from the Ohio River to Lake Erie (Page 42).

Labor Relations Stiffen as Growth Slows

Watch for hardening labor relations as the organizational growth of labor unions reaches its limit and charges of unfair labor practices multiply. The yearend report of the National Labor Relations Board showed a record number of cases filed with the board and another record set in the number of unfair practice charges filed. Compared with 1957, charges of unfair practices against unions were up 72 per cent, charges against employers were up 66 per cent. More collective bargaining elections were held after contested hearings, and unions lost a greater percentage of such elections than ever before.

Depreciation Reform: Reinvestment?

A tax reform that pays for itself—that's the claim of Maurice E. Peloubet, partner in the New York accounting firm of Pogson, Peloubet & Co., for his reinvestment depreciation (Page 54). His reform works like this: When a property is retired, you can deduct the difference between its value in current dollars and its cost at the time it was acquired. That amount, added to what was already written off, will compensate for the decline in the value of the dollar. The deduction would be allowed only to the extent that an equivalent investment is made within two years of retirement. The amount written off in the first year would be deducted from the depreciable basis of the new property.

Manufacturers Decry California Taxes

California manufacturers charge that business is being taxed out of the state. Costs of doing business there are rising out of proportion to those in other industrial states, says the California Manufacturers' Association. The four

major problem areas cited by the CMA are high state levies, transportation costs, wages, and local taxes.

And Then There Were Three

The market for steel rails took a thumping last year, but don't believe it when you hear that the market is vanishing. There will always be some need for rails; your shipments aren't going to be delayed because railroads can't find replacement rails. The three producers still in the business (U. S. Steel, Bethlehem, and Colorado Fuel & Iron) are going to stay in it. They're convinced that the market isn't going to get much lower than it is now. Plenty of capacity will always be available: The railmakers can't afford to desert the field (Page 111).

Indiana Legalizes SUB Plan, Ohio To Follow

Indiana has legalized the integration of unemployment compensation and supplemental unemployment benefits. Gov. Harold Handley signed a bill which also raises unemployment coverage to 26 weeks, $39 maximum. The Ohio legislature is certain to follow suit soon. Gov. Michael DiSalle is expected to sign quickly. The only states left which disallow SUB plans will be Virginia and North Carolina.

Planned Growth at Hoover Ball & Bearing

If you're plotting to capture more of your potential markets in the 1960s, you'll want to read this case history of the Hoover Ball & Bearing Co., Saline, Mich. (Page 45). It plans to double its participation in the bearing market by the time it reaches $1 billion proportions in 1965. Product expansion and world trade will do the trick, claims Hoover.

New Cars Produce Steel Scrap Piles

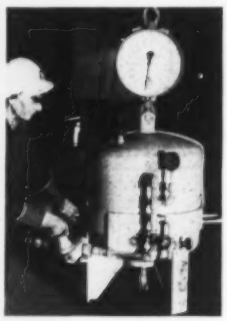
Every new car that rolls off a Detroit production line returns about half a ton of scrap to steelmakers, says the Institute of Scrap Iron & Steel Inc. If automakers turn out the hoped-for 5.5 million units this year, the institute estimates that close to 3 million tons of high quality scrap will be baled and returned to steel mills and foundries. At the other end of the road, after service life of 10 to 11 years, between 4.5 million and 5 million cars and trucks are scrapped annually and also returned to steelmakers.

Nuclear Plane Problems Solved

Development of a workable nuclear-powered airplane is much closer than expected. Most of the problems have been solved, says a Lockheed Aircraft

Corp. engineer. F. A. Cleveland, chief advanced design engineer at Lockheed's Georgia Div. at Marietta, says aircraft design, crew protection, and crash hazards have been largely worked out by scientists and engineers. The designer also predicts a new concept in low level bombing tactics for the plane will replace earlier ideas of operations at extremely high altitudes.

More Plants To Make Leaded Steel



You can expect more plants to be built or modified to meet the growing demand for leaded steel. Three bessemer converters produce six 10-ton ingots per heat in one of the newer facilities at U. S. Steel Corp.'s National Tube Div., Lorain, Ohio. Pouring of ingots and addition of lead are carefully controlled in the shop; modern testing equipment and methods are used in the laboratory. Results: Better quality, free machining steel. Fabricators like it for cold drawing applications; it's turned out as fasteners (Page 82).

Checklist for Foreign Licensing

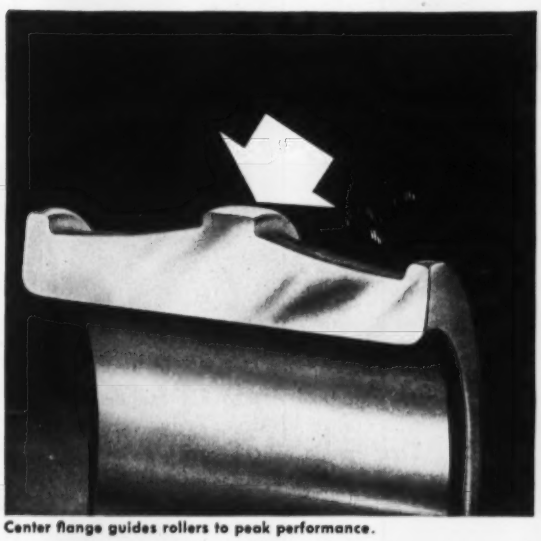
Choosing licensees carefully and defining your objectives are key factors in successful foreign licensing agreements, says the National Industrial Conference Board. Licensing executives who joined in an NICB study suggest these guidelines: Maintain a flow of new or improved technical knowhow; don't tie the agreement to the life of a patent; build up the value of the company trademark and require its use; acquire an equity interest; separate license rights for key components; license manufacturing and distribution rights separately, and see that agreements are reciprocal, equal.

Executive Warns of Foreign Unionizing

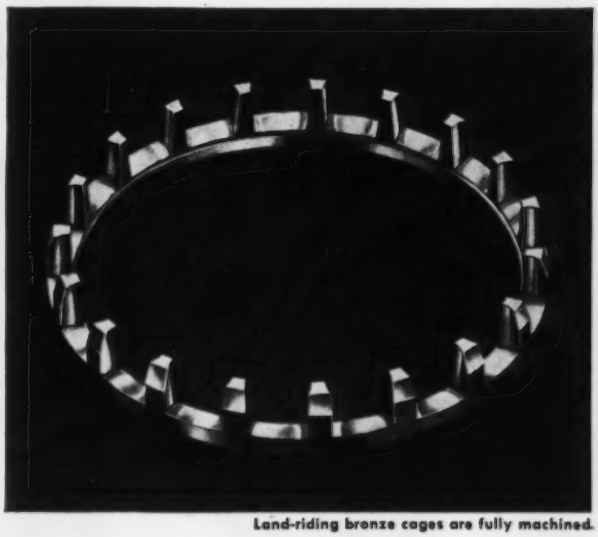
A New York shipping executive warns U. S. firms with foreign operations that domestic labor fights may develop if unions start organizing foreign labor on the basis of employer nationality. William C. White, president of Alcoa Steamship Co., New York, points out that shipping boycotts by the national maritime unions organizing alien seamen could set a pattern for other unions to organize plants abroad because they are run by U. S. firms. Labor strife at home could result in any industry if shipping boycotts work, he adds.

Straws in the Wind

De Soto Div. of Chrysler Corp. will invest $25 million in model engineering, says General Manager J. B. Wagstaff, dispelling rumors that the division might close its doors . . . Diesel powered taxicabs will be operating on Cleveland streets within a year, says President Arthur B. McBride of Yellow Cab Co. Pilot models have already been tested . . . The world's largest private research reactor has been started up at a $4.5 million research center at Plainsboro, N. J. Industrial Reactor Laboratories Inc., a group of ten companies, houses its reactor in an 87 ft high, aluminum sheathed, concrete dome . . . Consumer prices dipped 0.1 per cent in February to 123.7 per cent of the 1947-49 average; the wholesale price index held steady for the same period.

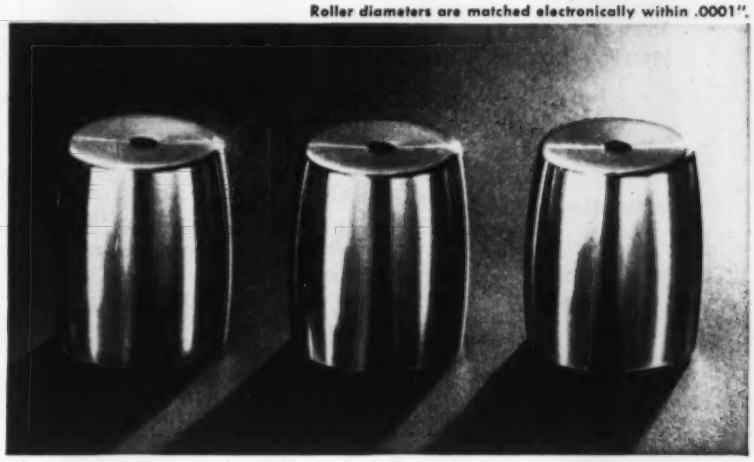


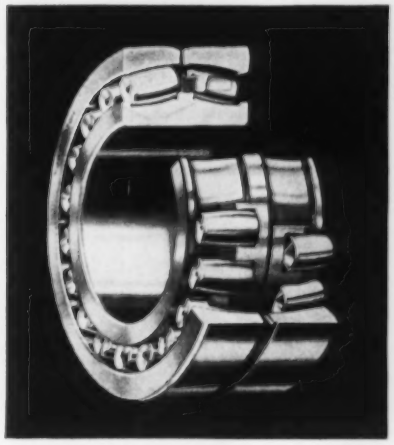
Center flange guides rollers to peak performance.



Land-riding bronze cages are fully machined.

Roller diameters are matched electronically within .0001".





Consider every design feature and you'll choose Torrington!

Torrington has compromised none of the operating design features of its Spherical Roller Bearing, because application experience has proved them essential to superior bearing performance.

There's no substitute for the stabilizing effect of the integral center guide flange. Torrington's asymmetrical roller seeks this flange under load. Skewing and stress concentrations are eliminated. Every roller carries its share of the load, for roller diameters are matched electronically within .0001" for even load distribution.

Rollers are precisely spaced by fully machined land-riding bronze cages that withstand even the high stresses of eccentric service. Two independent cages, one for each row, prevent roller drag and side stresses under thrust loads. Size-stabilized races prevent "growth" or change in dimension in service.

These features mean a cooler-running, longer-lasting bearing. When you buy bearings, look into *every* detail, and you'll choose Torrington. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

Superior performance features of TORRINGTON SPHERICAL ROLLER BEARINGS:

- Integral guide flange for roller stability
- Asymmetrical rollers seek flange for positive guidance
- Electronically matched rollers
- Size-stabilized races
- Fully machined land-riding bronze cages
- Controlled internal clearances
- Even load distribution
- Inherent self-alignment
- Long service life

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ARMCO FREE-MACHINING BARS

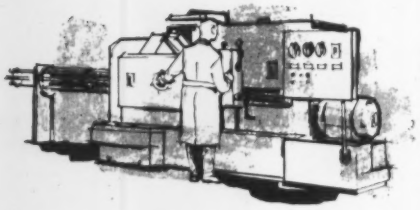
Help You Cut Costs on Stainless Jobs... From Start to Finish

In Your Planning—

11 grades of Armco FM Stainless offer a wide range of sizes, shapes and finishes. They enable you to save right off the bat: Use higher speeds, remove less metal, even eliminate some operations.

Screw Machines Secondary Operations—

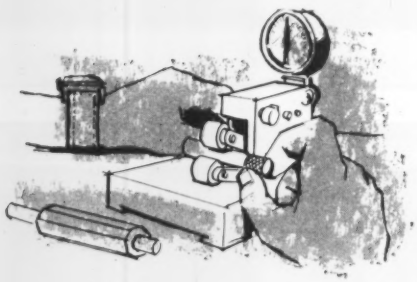
Uniform machinability of Armco FM Stainless assures maximum production, makes it easier to hold size and finish tolerances. Use Armco's manual, motion picture, or machining specialists to eliminate "bugs" and for production-increasing tips.



Inspection—

Armco FM Bars are pre-inspected at the mill with the most modern magnetic equipment. Defective bars with cracks, seams and slivers don't get in your order. Costly rejects that waste your time and money are reduced.

Try Armco Free-Machining Bars on that next stainless job. See how they can help you cut costs. For information on sizes, shapes and grades available, as well as helpful machining information, just fill out and mail the coupon.



New steels are born at Armco

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SEND ME ☐ Information on sizes and grades of Armco FM Stainless
☐ Your manual, "Machining Armco Stainless Steels"

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People's Capitalism!

One of our most compelling needs in America is to erase the line of demarcation that has grown between management and labor, especially with the rise of the union movement.

Profit sharing trusts, retirement benefits, and the like are steps in the right direction.

But they are—in the strictest sense—a form of compensation for work.

Now there is a growing movement to take the next step in creating a better climate in industry.

It is what Chairman Joseph L. Block of Inland Steel Co. calls People's Capitalism. Through stock purchases, Inland employees share in the ownership of the company they work for.

Inland launched its first employee stock option plan in 1952. When the three year program expired, 5362 employees had purchased 159,302 common shares at the option price of $42.25 per share. Under the second plan (it expired July 31 last year), 7875 employees had purchased 196,482 shares at $69.75.

Under the new plan started last August, employees with at least two years' service can authorize payroll deductions of up to 10 per cent of their salary or wages to buy stock at the end of successive six month periods. The cost is 90 per cent of the fair market price at the end of each period.

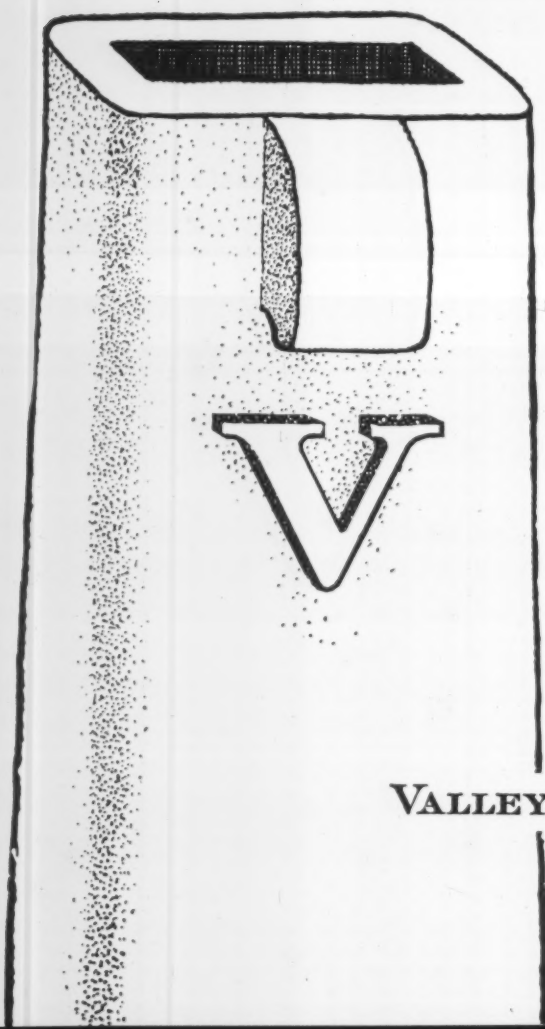
By Feb. 1, 6385 employees had purchased 13,068 shares at $128.93 a share.

Sharing in ownership helps give employees a better understanding of a company's objectives and its problems.

It gives them a better sense of responsibility in their work. It encourages teamwork.

Both management and the workingman share in the payoff.

Irwin H. Such
EDITOR-IN-CHIEF



Tomorrow

we'll harness the energy of the sun . . . . .

but even then

steel will be poured into

VALLEY INGOT MOULDS

VALLEY MOULD AND IRON CORPORATION

GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio

American Smelting & Refining Co.

Lead, Zinc Shaking Off Recession

LEAD AND ZINC sales will make a comeback this year after being battered during the first three quarters of 1958 by the slump in consuming industries.

STEEL estimates slab zinc consumption will rise 10 to 20 per cent to post the best mark since 1956 (see Page 40).

Lead consumption should gain 5 to 10 per cent in 1959 but will still be under the 1957 figure.

• **Market Rundown**—All consuming areas will show modest growth this year. Lead demand shapes up like this:

Batteries—Replacement sales will hit around 26 million units, compared with 25,270,000 units last year, predicts the Association of American Battery Manufacturers. The new car market should take about 1.1 million more units than it did last year (assuming 1959 output will be around 5.3 million cars).

Tetraethyl Lead—Total consumption will be more than 5 per cent this year, believes E. I. du Pont de Nemours & Co. Reason: "Increased consumption of gasoline and a slightly higher dosage of tetraethyl lead."

Construction — This market dropped only slightly last year and is expected to rise 9 to 10 per cent in 1959.

Miscellaneous lead uses should show a modest across-the-board upswing.

• **Galvanizing Spurs Zinc** — The strength in the galvanizing market was one of the few pleasant surprises of the recession. Zincmen shudder to think what would have happened if galvanizers hadn't ordered more zinc last year than they did in 1957.

In 1958, galvanizing again passed diecasting as the number one zinc user, a trend that will continue in 1959. Says one maker of galvanized sheets: "This year, sales are a hell of a lot better than they were in 1958. We're really booming—sold out through June. In fact, we're taking orders for the third quarter."

Shipments of galvanized sheets will hit around 3,150,000 tons, compared with 2,828,848 tons last year. Production will probably be a little higher than shipments since demand is expected to slack off considerably in the third quarter as users take a look at their inventory positions. Hot dip galvanizers aren't experiencing quite the spurt the sheet people are, but they expect 1959 to bring some improvement.

Other zinc uses will also pick up this year:

• **Diecastings** — First quarter sales are about 18 per cent ahead of those in the same period last year. But the industry has been disappointed in its sales to automakers (even though they're ordering more than they did last year). It's expected

Lead-Zinc Short Range Outlook . . .

Use To Rebound in '59

(Tons)

LEAD

	1959*	1958**	1957
Storage Batteries	335,000	307,673	361,015
Tetraethyl Lead	167,000	158,302	177,001
Cable Covering	80,000	74,535	108,225
Construction	125,000	112,692	117,847
All Others	349,000	329,198	374,027
Totals	1,056,000	982,400	1,138,115

ZINC

Galvanizing	430,000	370,711	367,757
Zinc Base Alloys	340,000	273,990	376,039
Brass & Bronze	120,000	99,503	112,390
Rolling Mills	41,000	38,640	41,269
All Others	35,000	28,060	38,165
Totals	966,000	820,704***	935,620

Source: U. S. Bureau of Mines.
*Estimated by STEEL.
**Preliminary.
***Total is greater than sum of individual tonnages because "unreported consumption" has been added to it.

that the auto industry will become a much more active buyer in the next few weeks.

The silver lining in last year's diecasting picture: Shipments to manufacturers of appliances, which went up even though appliance sales were off 8 to 9 per cent. Reason: Greater use of zinc diecastings per unit. Forecasts peg a 5 to 7 per cent gain in appliance sales this year.

• **Brass and Bronze**—Zinc will continue to keep pace with mill shipments—it's unlikely changes in product mix or new alloys will cause any appreciable change. Mill shipments this year will top 1957's by a good margin.

Other zinc uses will show modest increases this year.

• **Production Up**—If you're a buyer of lead and zinc, don't worry about a shortage. World production of both metals still runs far in excess of consumption. For example, even though Free World refined lead output was cut 88,753 tons to 1,591,665 tons last year (79 per cent of total), it still exceeded deliveries to consumers by 13 per cent.

Domestic mine output of lead and zinc will be boosted sharply this year—perhaps as much as 30 per cent. Paradoxically, there will be less metal on the U. S. market than there was in 1958. Here's why: Last September, the President imposed quotas which limit annual imports of metal and concentrates to 483,000 tons of recoverable zinc and 350,000 tons of recoverable lead. In 1958, imports of zinc registered 636,000 tons; lead imports came to 540,000 tons.

Look for domestic smelters to turn out around 900,000 tons of slab zinc, compared with 828,902 tons in 1958. Add to this figure the 141,000 tons of zinc metal that can come in under quotas, and you have a total domestic availability of 1,041,000 tons.

Lead smelter output (primary and secondary) in 1959 will parallel the 904,000 ton figure of last year. Metal imports of 222,000 tons will bring domestic availability to 1,126,000 tons.

• **Troubles** — Producers of both metals still have problems. For example, it will be some time before civilian uses will sponge up the additional metal producers shipped to government stockpile before the program ended last year. The barter program, which used to siphon off excess world supplies of both metals, has been made virtually inoperable by Department of Agriculture restrictions.

Quotas haven't had too much effect on the market. Here's why: A lot of refined metal and ores were brought in prior to quotas and stored in warehouses. This material is still being worked off. Also, quotas don't put any restriction on imports of lead and zinc fabricated items. (This was never too important in zinc, but a lot of lead products came into the U. S. until producers got the domestic price pretty much in line with overseas quotations.)

• **Stocks Too High**—All those factors plus last year's consumption dip, have caused stocks to spiral.

Statistically, zinc's in a much better position than lead. Consumption should exceed output, so that there will be some stock reduction over the year. (Stocks stand at a little over 200,000 tons, down substantially from July when they were at 258,000 tons.)

Lead stocks have consistently gone up. In January, they were at 208,874 tons. Look for them to continue to rise until late summer or early fall, then decline.

• **What To Expect**—Both metals should wind up the year being quoted between 11.5 and 12 cents a pound. Some sporadic flurries may come in between, but the outlook is for greater stability than in prior periods.

Widespread labor trouble could come later in the year, but it

needn't worry consumers. Stocks are high enough so demand can be met even if the walkouts are lengthy.

There's an outside chance of more agitation in Congress for a tariff on imports (in lieu of quotas). The consensus is such a move would have little chance of becoming law because of President Eisenhower's often expressed disapproval of duties.

• **Where They're Headed** — Look for steady (but not spectacular) growth for both metals through penetration of present markets and a sprinkling of new uses.

Some examples: Galvanizing will continue to grow. Construction of new continuous lines has been announced by several steelmakers. There's a possibility of heavier zinc coatings being put on sheets to increase atmospheric corrosion resistance. Aluminized steel probably won't invade the traditional galvanizing markets, except where heat resistance is a primary consideration.

In the automotive industry, per car use of zinc will continue to rise, believe producers. Strong rumors have it that three auto divisions will switch back (from aluminum) to zinc grilles in 1960 models. Carbuilders will probably make increased use of zinc in plating applications.

Lead is faced with either static or shrinking markets in cable coverings, some pigments, ammunition. Battery sales will keep pace with population increases although a few rising uses (like battery powered industrial trucks) may spur demand a little. Tetraethyl lead sales have declined as far as they will and should grow at a yearly rate of 3 to 4 per cent.

• **Research: Key to Future**—Over the long term, producers of lead and zinc are putting their money on research as the best means of opening up new markets and expanding old ones. The joint research efforts of the American Zinc Institute and Lead Industries Association are beginning to move into high gear (see program at right).

• **Summing Up**—In 1959, expect: Fairly stable prices, higher production, increased consumption, new and improved products.

Lead-Zinc Long Range Outlook . . .

Market Expansion Through Research

(Projects under contract or formally programed by American Zinc Institute and Lead Industries Association)

Lead

1. Investigation of continuous casting of cable sheathing to eliminate press downtime, lower production costs, and give more uniform metallurgical qualities.

2. Re-evaluation of the lead alloy systems through study of precipitation hardening, work hardening, and creep.

3. A study of whether metal fiber reinforced lead will give the metal higher tensile and creep strength, better fatigue strength, and greater stress vibration.

4. Investigation of manufacturing wrought products via powder metallurgy to obtain improved shielding materials and develop new products.

5. An examination of lead chemicals to search out new compounds and find how present compounds can be modified.

6. An evaluation of lead potentials in ceramics and glass.

7. A fundamental study to find practical applications for lead's heat and light emission characteristics.

Zinc

1. A study of better finishes for zinc diecastings to improve surface and corrosion resistance.

2. A program to develop new diecasting alloys with improved physical properties, castability, creep resistance, and finishing characteristics.

3. A program to minimize wet storage stain of galvanized products by coating treatments.

4. An examination of how to lengthen the life of galvanized hot water storage tanks by modifying alloy compositions and engineering design changes in the tank.

5. An evaluation of protecting cargo compartments in tankers with zinc anodes.

6. A study of potential uses for rolled zinc in architectural applications.

7. A program to develop methods for improving the surface treatment of lithographers' plates.

8. Exposure tests to study reactions of zinc oxide paints to weather and smoke, leading to improvement in tint retention, durability, nonchalking action, and resistance to mildew.

What Cleveland Belt Plan Means

PROPOSALS for a conveyor belt system to transport ore from Cleveland's lakefront to steel plants flanking the Cuyahoga River could mean $25 million to $35 million in hardware contracts for the conveyor industry. Cleveland steel companies have indicated their interest in speedy completion of studies for the project.

The belt would circumvent the kinky course of the Cuyahoga River which has to be navigated by ore carriers going upstream to the plants of American Steel & Wire Div. of U. S. Steel Corp., Republic Steel Corp., and Jones & Laughlin Steel Corp. About 1050 cargoes of ore are unloaded at Cleveland during an average season. About 600 of them travel up the river; at that rate, the belt could mean a saving of $1.8 million annually. The arithmetic: 30 hours in saved turnaround time for each boat; the operating cost of a boat, about $100 an hour.

• **Really Moves**—The belt would handle 6000 to 8000 tons of ore per hour. In 1957, the port handled 11 million gross tons. When the St. Lawrence Seaway is established, that figure could jump to an anticipated 19 million gross tons annually, says the Riverlake Engineering Council, a group of engineers representing 15 manufacturers of belting, conveyor, dock unloading machinery, and electrical equipment.

The belt's backers say that it would attract the largest ore boats that will be able to use the St. Lawrence Seaway.

Sponsors also indicate the belt could mean a $6 million expansion of the Pennsylvania Railroad's ore dock in Cleveland.

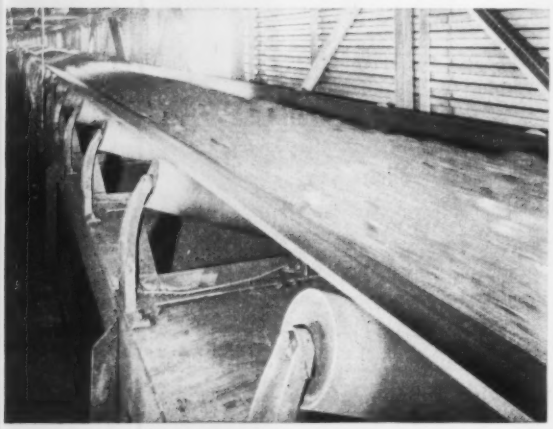
The road has four Hulett unloaders on its lakefront property—it costs about $1,750,000 to build a new one.

• **New Theory?**—The plan could also signal adoption of a new theory in railroad freight movement. The groundwork is there. Three railroads are involved in the Cleveland proposal: The Pennsylvania, the Newburgh & South Shore Railroad, and the Akron, Canton & Youngstown Railroad, owner of the Riverlake Belt Conveyor Lines Inc., one of the sponsors of the proposal. The alternate 12 or 17 mile routes for the belt may be built over or alongside the rights of way of the Pennsylvania and Newburgh & South Shore in Cleveland.

• **The Parallel**—A 108 mile coal pipeline between Cadiz, Ohio, and a generating plant of the Cleveland Electric Illuminating Co. went into operation in mid-1958. The coal is crushed and mixed with water to form a slurry before shipment through the pipe. Three railroads, the Pennsylvania, New York Central, and Nickel Plate, each were given options to buy a 15 per cent interest in the venture, which is said to clip the cost of shipping by rail in half. The railroads gave rights of way in return for the options (STEEL, Feb. 25, 1957, p. 58).

The pipeline is owned by Pittsburgh Consolidation Coal Co.

• **Battlelines** — The support and leadership of the railroads in the belt proposal are viewed in some quarters as the first wedge in an attempt to revive ten year old plans for an overland conveyor from East Liverpool on the Ohio River to northeastern Ohio. "The belt conveyor proposed for Cleveland apparently would handle only iron ore and be a material handling device, not a form of transportation, such as the 103 mile Riverlake conveyor would pretend to be," says Joseph S. Gill, counsel for the



This enclosed Link-Belt Co. unit, similar to the proposed Cleveland type, operates at Clinchfield Div. of Pittston Co.

Another section of Clinchfield's coal preparation system carries shale up a 2400 ft slope for disposal

Ohio Railroad Association.

He maintains: Despite the status of the Cleveland belt, the railroads would continue to oppose a belt conveyor that would link Lake Erie and the Ohio River. "Ohio railroads have successfully opposed Riverlake's efforts to obtain rights of eminent domain on the ground that the 103 mile belt cannot classify as a common carrier. It would transport only coal and ore, and service a few customers—not the public."

• **Union Opinions** — "It seems to me as if the Cleveland plan is a means of getting a foot in the door to do something the legislature of Ohio wouldn't permit to be done. It would be an abuse of the power of eminent domain by the railroads. I view it as another step toward the abandonment of railroad operations which a lot of so-called railroad companies seem to want these days," says Guy L. Brown, grand chief engineer, Brotherhood of Locomotive Engineers. In the past, other unions have gone on record as favoring belt conveyors.

• **Riverlake's Opinion**—"The fact that we gave priority to the Cleveland Line study certainly doesn't mean abandonment of our 103 mile lake to river project. We believe the Riverlake conveyor is inevitable," says H. B. Stewart Jr., chairman of Riverlake.

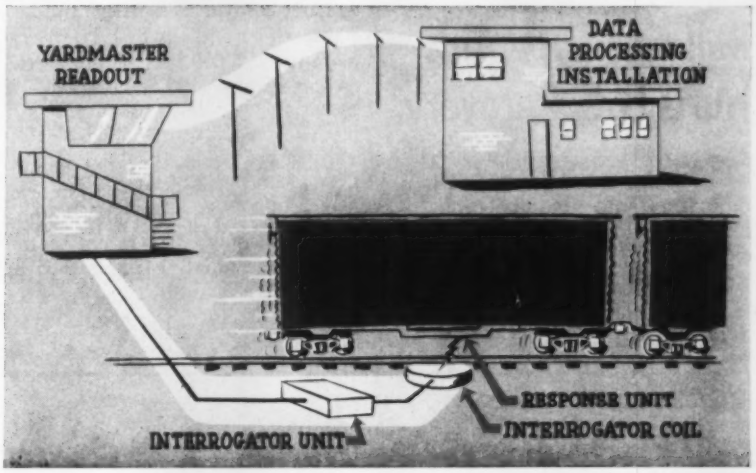
Canadian Roads Order Cars

First break in the doldrums gripping the Canadian carbuilding industry last fall came with the award by the Canadian Pacific Railway of 1450 cars with four companies. National Steel Car Corp. will build 300 piggyback flatcars and 200 fifty-ton boxcars. Canadian Car Co. will build 500 fifty-ton automobile boxcars. Eastern Car Co. will build 300 fifty-ton boxcars, and Marine Industries Ltd., will build 150 covered hoppers.

Canadian Pacific's orders will involve expenditures exceeding $10 million.

Canadian National Railways has not indicated its plans for 1959, but observers think a substantial number of freight cars will be required by that system.

Tracer Eases Car Spotting



Electronic tracer will keep tabs on nation's freight cars. Steps: 1. Car passes over interrogator coil on tracks. 2. Response block fastened to underside of car sends out signal. 3. Signal is converted into the car's number. 4. Information is relayed to data processing equipment

AN ELECTRONIC system for identifying and controlling freight car movement that could save this country's railroads millions of dollars annually was unveiled at Chicago last week.

Called Tracer, it is a development of Link Aviation Inc., Binghamton, N. Y. The system works with a central control facility and data processing equipment to provide continuous information on the location of every freight car in a railroad system.

• **Applications for Tracer**—In announcing the development, David Mason, president of Link, said other potential uses are being studied. Examples: On-the-ground terminal control of aircraft and en route control and spacing of city transit vehicles.

Mr. Mason believes Tracer might be used for in-plant production control and scheduling, particularly in mass production industries where it could identify and control workpieces coming into an assembly area.

• **Operation Is Foolproof**—Tracer consists of two major components—a small response block which would be attached to the underside of freight cars or other vehicles, and a magnetic interrogator which picks up the signal from the block and relays it to the control center.

The response block is an inert mechanism consisting of transistors, coils, and filters. It is hermetically sealed, has no power source, and can't wear out. An interrogator coil (a single turn conductor of copper or aluminum) is placed in the ballast of the roadway. As the block passes over the coil, the magnetic field of the coil excites the block which sends out a signal. The signal is in turn picked up by the coil and sent to an interrogator unit which decodes the signal and relays it into the data processing equipment.

Each block sends out a unique signal. So it will be possible to identify individual cars, wherever they may be.

• **Cost Cutter**—Identifying, controlling, and tracing freight cars are major operating expenses of railroads. Link's Tracer system, if employed collectively by the nation's Class I railroads, would greatly accelerate the process. Mr. Mason feels that Tracer will first be installed and proved on captive railroads and transit systems. It is directly compatible with present data processing equipment.

Western Railroad Supply Co.,

Chicago, has worked out an arrangement with Link to sell the system.

Rail Car Lack Aids, Hurts U. S. Recovery

A MOUNTING shortage of railroad freight cars is forcing eastern railroaders into the dual role of hero and villain in metalworking's recovery.

The villain: Roads must answer to irate customers whose shipping docks are piled high with orders.

The hero: Railroad buyers are splurging on new car orders to meet demand—to the delight of railroad suppliers. In 1959's first 11 weeks, more than 25,000 cars were ordered, compared with 17,500 in all of 1958.

• **1958 Legacy** — Lack of money last year forced cutbacks in car maintenance while freight volume was slack; now 8.9 per cent of the nation's car supply is sidetracked in "bad order."

Inland Steel Co. was compelled to curtail production at its Indiana Harbor works for lack of boxcars; U. S. Steel Corp. avoided a slowdown at Pittsburgh by switching shipments of coiled steel sheet to truck and barge.

Carloadings, in the first week of March, were 9.5 per cent above those in the same 1958 period. "If revenue carloadings later this year should be 10 per cent above those for 1958, the anticipated serviceable freight car fleet on July 1 would not be adequate by about 50,000 cars," estimates the Association of American Railroads.

How To Cut Finishing Costs 10 Per Cent

If you stamp sheet metal and fabricate parts, here's a cost cutting guide developed from a Society of Automotive Engineers panel discussion. It may suggest a few ideas you've overlooked.

STYLING YOUR PRODUCT

- Do you look for joints you can conceal with moldings?
- Do you eliminate solder joints with moldings and trim where possible?
- Do you use sculptured steel styling and exterior beading to strengthen sheet metal panels? Eliminate additional welds and bracing?

TOOLING AND MAINTENANCE

- Do you provide enough die tryout time? Insufficient die tryouts cause more rejects than anything else.
- Do you try to design your dies so all breaks or initial draws come in binder areas? Binders must be hard enough to minimize wear.
- Do you scrape out die pockets before replacing interchangeable die inserts? Improperly seated inserts will leave panel impressions.
- Do you close dies on a sheet of polyethylene to pick up foreign matter before starting a stamping run?
- Is your handling equipment (fingers, rails, chutes) designed to avoid damaging sheets during processing? Welded subassemblies should travel on chutes and slide rails resting on unexposed interior surfaces. Panel and assembly turnover devices should be cushioned to prevent marking panels.

MATERIAL HANDLING

- Do you try to avoid dense boxcar loading? Determine how you will ship parts before they go into production. You can then make product changes to eliminate shipping tabs or reduce flange widths.
- Do you use a shake rig to test your packaging methods before shipping? You can design a simple one in your plant.
- Have you checked the storage of parts during assembly to see that they won't be damaged while waiting for another operations?
- Is it worthwhile for you to install a monorail for in-plant handling of flat panels? Handling with fork lift trucks often damages these parts.

ASSEMBLY TECHNIQUES

- Do you regularly check assembly tool designs? Marking by clamps, locators, and welding guns should not be tolerated.
- Are you facing locators on fixtures with soft materials? It's inexpensive and may prevent marking.
- Do you systematically check pressures and clearances of swinging clamps?
- Do you use copper facings where resistance welds are made on exposed surfaces? If not, do you use special welding gun tips?
- Do you use guides to prevent damage caused by careless handling of portable welding guns?

PROCESSING METHODS

- Do you check preliminary product designs to determine the best possible joint locations?
- Do you review all hand operations to see if there are any that can be replaced by power tools?
- Do you periodically check to make sure you're using the proper abrasive grits for belt sanders and wheels? Check surface speeds at the same time.
- Have you considered using low pressure, air inflated drums for finishing compound curved contours? How about slotted rubber wheels for abrasive sleeves on some jobs?
- Can you redesign parts to avoid finishing steps that require expensive cartridge rolls?
- Do you periodically check inspection techniques in your plant?

• An extra copy of this article is available until supply is exhausted. Write Editorial Service STEEL, *Penton Bldg., Cleveland 13, Ohio.*

Hoover Ball Bearing Grows Two Ways

It plans to snare 8 to 10 per cent of market by 1965. It'll do the job by merging with other companies, taking advantage of foreign tie-ins, and boosting quality

HOOVER Ball & Bearing Co. expects to capture 8 to 10 per cent of the bearing market (now $750 million) by 1965. That's more than double the Saline, Mich., firm's present share of just the ball bearing market. It's counting on planned expansion to do the job.

By 1965, bearing sales will total $1 billion annually, predicts Clifford H. Simmons, Hoover's chairman. Now operating at 90 per cent of capacity, Hoover must expand its facilities at least a third to keep pace. To penetrate deeper into the highly competitive field, the company will have to at least double its capacity. It's confident it will reach the target by following the same growth pattern it has used in the last few years.

Mr. Simmons aims for a 15 per cent gross return on investment. He pays careful attention to product diversification, market coverage, and plant modernization. Hoover's story demonstrates how planned growth can help small and medium sized firms, as well as big ones.

• **History**—The Hoover story starts with another company, Universal Die Casting & Mfg. Corp., Saline. It was founded in 1943 by Mr. Simmons and William Brittain, who is Hoover's vice chairman. Universal was started as a zinc diecasting firm to supply parts to the hardware, plumbing, and automotive trades. First year sales totaled $107,000.

In the next ten years, the firm grew steadily with the postwar boom. A holding company was formed into which were tucked several acquired firms and others Universal had organized. Holdings included aluminum and brass diecasters and more zinc producers. Although sales reached $6.1 million in 1954, Messrs. Simmons and Brittain felt that diecasting markets were limited and profit margins tough to maintain. They looked for products with more market potential and found Hoover Ball & Bearing Co., Ann Arbor, Mich.

Hoover had been producing ball bearings since 1913. It maintained high quality because of patented processes and machinery for honing bearing races. But the firm had not grown much since the war. Management wanted to retire. It was a natural move to merge with Universal, retain the Hoover name, and turn management over to Messrs. Brittain and Simmons.

The firms merged in '55. Uni-

Critical inspection precedes assembly at Hoover's Ann Arbor, Mich., plant

Hoover Ball & Bearing Co.

NAME	LOCATION	PRODUCTS	MARKETS
OPERATING DIVISIONS			
1. Hoover Ball & Bearing Div.	Ann Arbor, Mich.	Ball bearings Balls	OEM Replacement
2. Universal Diecasting Div.	Saline, Mich.	Zinc diecastings	Automotive
3. Adrian Div.	Adrian, Mich.	Zinc diecastings	Automotive
4. Utilex Div.	Fowlerville, Mich.	Zinc diecastings	Automotive Plumbing
5. Glenvale Products Div.	Malvern, Ark.	Aluminum & brass diecastings	Plumbing Hardware
WHOLLY OWNED SUBSIDIARIES			
1. Uniloy Inc.	Saline, Mich.†	Tools & dies Machinery Research & development	For company use only
2. Strom Steel Ball Co.	Erwin, Tenn.	Steel balls	Bearings
3. Coolidge Corp.	Middletown, Ohio	Steel balls	Bearings
4. Hoover International Inc.	Saline, Mich.*	Sales division	Foreign
AFFILIATION			
1. Nishi Nippon Seiko	Otsu, Japan	Ball bearings	Foreign & domestic

†Hoover corporate headquarters located here.
*Now being formed.

versal's holding company was dissolved and its divisions set up as Hoover operating divisions or wholly owned subsidiaries. Since the merger, the firm has acquired four more companies and other assets which have been welded into the corporate structure (see Page 45).

• **Products** — Hoover's business is divided into three broad categories. Zinc diecastings are turned out for the automotive field, which accounts for some 40 per cent of the firm's business. Zinc, brass, and aluminum diecastings are manufactured for the plumbing and hardware markets. Balls and ball bearings are made for original equipment and replacement markets. Some bearing components are sold to other bearing manufacturers.

Fiscal 1957 sales totaled $22.2 million. In 1958, sales were $22.6 million. Earnings rose 12 cents per share. Mr. Simmons anticipates $26 million in sales in fiscal 1959.

• **Markets**—Perhaps Hoover's most interesting maneuver is its recent affiliation with Nishi Nippon Seiko (NSK), Japan's largest ball bearing producer.

Hoover and NSK jointly own an NSK subsidiary plant near Otsu, Japan. Through this relationship, the company has broadened its product line to cover the 4000 to 5000 bearing sizes used throughout the world. It's cheaper to acquire extra sizes this way, asserts Mr. Simmons. It costs $5000 per size to tool up.

The U. S. company is also forming an international sales subsidiary to market Hoover and NSK bearings in foreign and domestic markets. Many of the bearings produced by NSK will be imported for replacement use. Mr. Simmons says they'll be priced competitively. He anticipates no complaints from buyers who might prefer "made in America" products.

About 50 per cent of Hoover's domestic bearing output is for the electric motor industry. Another 15 per cent is automotive, 20 per cent replacement, and 15 per cent goes to miscellaneous markets, such as farm and material handling equipment. Original equipment products are sold through the company's own sales staff. Replacement bearings are marketed through distributors.

'60s' Labor Market To Favor Oldsters

A SHORTAGE of skilled workers will likely develop because of the stability of the 25-44 male age group during 1955-65. It means older workers will have greater job opportunities, reported Louis Levine, assistant director, Labor Department's Bureau of Employment Security, at the National Vocational Guidance Association convention in Cleveland.

• **Calendar No Criterion** — Too often men and women are considered old when they reach an arbitrary age, such as 45, 60, or 65. "The age at which a man becomes too old to work varies with the individual and occupational requirements," Mr. Levine declared.

When older people become unemployed, they tend to remain out of work longer than younger folks (although their unemployment rate is lower).

This applies at all educational levels, regardless of the industry or the skills of the individual.

• **Population Booms** — While our population doubled between 1900 and 1955, the number of persons in the 45 to 64 bracket tripled, and those over 65 quadrupled. Estimates say over 10 million will join our work force during 1955-65. Yet the prime work force (25-44) will show little change. The group is a victim of the low birth rate in the thirties.

Reflecting the postwar baby boom, the 14-25 age group will see a 32 per cent rise. The remainder, more than 5 million and representing 50 per cent of the total increase, will come from the 45-and-over group. Women and young people, who traditionally have the highest turnover, are expected to provide additional manpower to meet business growth. "Older workers can contribute significantly to the stability of the plant work force and production knowhow," asserted Mr. Levine.

• **Changes Coming**—Major changes will appear in the labor picture: 1. A long term rapid growth of whitecollar jobs (they outnumbered bluecollar employees for the first time in 1956). 2. A slower growth of bluecollar occupations because of a continuing rise in the skill level. 3. A sharp decline in farm employment. 4. A faster than average growth among service workers. An increasing number of workers for part time employment is also foreseen.

Demand for greater industrial skills is expected in the growing durable goods section of manufacturing. Twenty-four percent of the workers in durable goods industries are skilled, compared with 14 per cent in nondurable goods industries.

• **Best Opportunities** — The most favorable futures are to be found in construction, which will gain 25 per cent by 1965, and trade and service, which will jump 20 per cent. Manufacturing will be up 17 per cent, and a 10 per cent increase is seen for public utilities.

Mr. Levine concluded: "The older people will be confronted, the same as others, with increasingly rigorous hiring specifications as to educational attainment, skill level, and technical competence. New emphasis must be given to training programs for older workers."

New Ore Project Planned

Iron Ore Co. of Canada, Toronto, Ont., will develop its second major iron ore project in Labrador. A mine, concentrating plant, powerplant, and town to house 3500 will be built at Carol Lake, 220 miles north of Seven Islands, Que., a Gulf of St. Lawrence port. Cost: $150 million.

The facility is expected to produce 6 million tons of high grade ore annually by 1962. The ore company's other Labrador mine at Schefferville (Knob Lake) yielded 7.8 million tons of ore last year.

Carol Lake is near Wabush Lake, where Wabush Iron Co., Labrador, is working on a similar development.

Large owners of Iron Ore Co. of Canada include Hanna Mining Co., Republic Steel Corp., Armco Steel Corp., National Steel Corp., Bethlehem Steel Corp., and Youngstown Sheet & Tube Co.

Lockheed Trains Space Age Talent

Through 1965 there will be a shortage of skilled labor in the 25 to 44 age group, and this at a time when demand will be expanding (see Page 46).

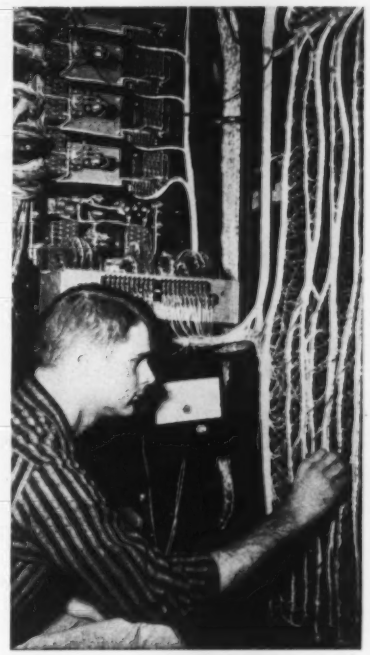
YOU CAN BE ASSURED of having a trained reserve of manpower if you propagate the trades with apprenticeship programs. That's the route followed by a prime contractor in the aircraft industry, Lockheed Aircraft Corp.

Lockheed's apprentice program has three phases: What the apprentice must know, what he ought to know, and what it would be nice for him to know. The training department of the Georgia Div., headed by Robert H. Hudson, provides all three. He points out: Because of hair-thin specialization, demand is great for skilled maintenance men, electricians, patternmakers, tool and die makers, machinists, jig and fixture builders, aircraft mechanics, and electronics technicians.

• **What To Do**—If you intend to start an apprenticeship program, look for employees who are aggressive, ambitious, mechanically inclined, above average in intelligence, and have leadership qualities. Lockheed finds those attributes in successful applicants. Interest in the company's program is high. Evidence: Applications come from all over the U. S. and Europe. The training can result in preparing the men who will be the foremen of tomorrow and can release the foremen of today to manage their departments.

• **Ground Rules**—First, the company stresses training for the apprentice with no compromises in favor of production. Second, the thoroughness of the training qualifies the apprentice to work for any aircraft company, or even go into business for himself. Third, the academic training is at the junior engineering college level.

Administration is provided by a Joint Apprenticeship Committee of five company and five union representatives, each serving two years.



A radio and radar apprentice earns while he learns during training at Lockheed's (Marietta) Georgia Div.

The training co-ordinator is responsible for day-to-day supervision of the program. An applicant must be between 18 and 23 years old. High school graduates are preferred, but applicants are given consideration if they have special job experience, training, or aptitudes. The committee meets each month to review the progress of each apprentice and advise in program matters. The work phases are also approved by this committee.

• **Course Work** — The company's training department has 34 men (25 are instructors). In many instances, the staff has prepared its own textbooks because suitable ones were not available. Courses include: Blueprint reading, mathematics, physics, and other sciences, plus instruction covering the company's organization, its production methods, policies, procedures, and regulations. Safety and accident prevention are stressed.

The term of apprenticeship is usually 8320 hours or four years. Each man must attend approved classes of related school instruction for a minimum of 144 hours—he is paid his regular hourly wage during this training phase. Each man works under the guidance of a supervisor and seasoned craftsman to whom he is assigned during on-the-floor training periods.

Wages at the Georgia Div. are competitive nationally. They are high for the area. The apprentice is advanced at the end of each 1040 hours of training. His wage begins at 60 per cent of the beginning journeyman wage and reaches 92 per cent during the final 1040 hours. At the end of training, the apprentice is placed in the job classification for which he is fitted and paid at the midpoint rate of the range.

• **Low Turnover**—Since the program's inception in 1952, each of the 34 men who have completed the term have received 8320 hours of training. Only two of them have taken jobs with other companies. (Another class of 20 will graduate in July.) A few who are in the Armed Forces are expected to return to Lockheed when their hitches are up. When the last class of 15 was selected, 400 applicants were screened.

The company plans to maintain at least 65 apprentices in training. The ratio cannot exceed one apprentice to ten journeymen in the various trades.

• **Worker's Reaction** — One radio and radar apprentice had over two years of college and was employed part time at Lockheed before he entered the apprenticeship program. He claims the course was much harder than what he had in college.

• **Union Rapport** — "There are many differences that arise between Lockheed and the union, but as far as apprenticeship is concerned, they always see eye to eye," says E. A. Demcheck, president of District 33, International Association of Machinists.

New Naval Bureau Proposed

DOING business with the Navy should be simpler if Congress O.K.'s a proposed change in bureau organization. The goal: Combination of the Bureau of Ordnance and the Bureau of Aeronautics into a Bureau of Naval Weapons. The change is in line with the Navy's emphasis on an atomic fleet and the change-over from guns and aircraft to missiles.

The new agency's job: To develop, procure, and maintain all Naval weapons. In the past, some people thought the two bureaus overlapped. The new agency would spend more than 25 per cent of the Navy's annual appropriation (about $3 billion in fiscal 1960).

The reorganization proposal is the result of a six months' study by top civilians and Navy officers. They also want a new position created: Deputy chief of Naval operations for development. This would tend to upgrade current activities of the antisubmarine experts and the Atomic Energy Division, say Navy sources. The new admiral in this job would also take over the Guided Missile Division and co-ordinate all R&D, test, and evaluation programs of the Navy.

Comment: The more centralized authority you have in defense buying programs, the better weapons you can produce. Old relations between firms and bureaus may be scrapped in the shuffle, but new sales opportunities should result for the firms closely tuned to the Navy's needs.

Chamber Seeks Better Procurement

U. S. Chamber of Commerce is warming to a task long held back by red tape and inertia: Space Age weapons at less cost. The chamber cites such absurdities as three pages of specifications for an ash tray.

In coming Congressional hearings, the group will ask elimination of detailed specifications on some defense contracts and substitution of general objectives, so defense firms can use their abilities to create more efficient products. The chamber thinks more off-the-shelf items can be used by the services. It will also seek further elaboration of the incentive system under which firms are allowed to retain a greater percentage of savings realized by cost reductions. Most of the reforms are in Sen. Leverett Saltonstall's (R., Mass.) S. 500, which is scheduled for consideration by the Senate Armed Services Committee.

Renegotiation Bill in Hopper

Ways & Means Committee will start hearings on renegotiation reform around May 1. The act expires June 30—it was extended six months last year to give both business and government time to evaluate its usefulness. Rep. Cecil King (D., Calif.) has introduced H.R. 5123 to amend the act this way: 1. The Renegotiation Board would be required to compare the costs and profits of defense industries against civilian industries when determining the reasonableness of defense contract profits. 2. The first 10 per cent of defense profits would not be subject to renegotiation. 3. More information concerning the board's decisions and its methods of arriving at decisions would be made public. 4. Appeals would be allowed from U. S. Tax Court decisions. (The House passed this amendment last year, but the Senate turned it down.)

Representative King is backed by the aircraft industry. His bill calls for a two-year extension of the act, on the assumption that it is not possible to push anything through Congress this year that will approach complete denial of the need for renegotiation. He notes that safeguards must be set up to forestall "windfall" profits.

7760 Tons of Copper to Russia

During the time former Commerce Secretary Sinclair Weeks allowed copper to be exported to the USSR (new Secretary Lewis Strauss reversed the decision), 7760 tons of copper and copper based alloys (worth $4.2 million) were licensed for export to the Communist bloc, reports Rep. Glenard Lipscomb (R., Calif.).

His efforts to get the House Banking & Currency Committee to conduct a full investigation of our policy toward exports to the Communists, suggests Congress may yet take the trade ball away from a Commerce Department which periodically reverses its field.

The State Department is not happy with Commerce's attitude and might welcome an open fight on Capitol Hill in the belief it could push through more moderate trade restrictions than Commerce now offers. It is known the British prime minister put pressure on Ike last week to allow trade.

Highway Activity at New High

Highways worth over $5 billion in federal-sponsored aid were under construction at the end of February.

During December and January, work continued at the $4.9 billion mark. Forty-eight per cent of the funds are in interstate highways, 42 per cent in ABC roads, and 10 per cent in the emergency highway program passed last year to help combat the recession.

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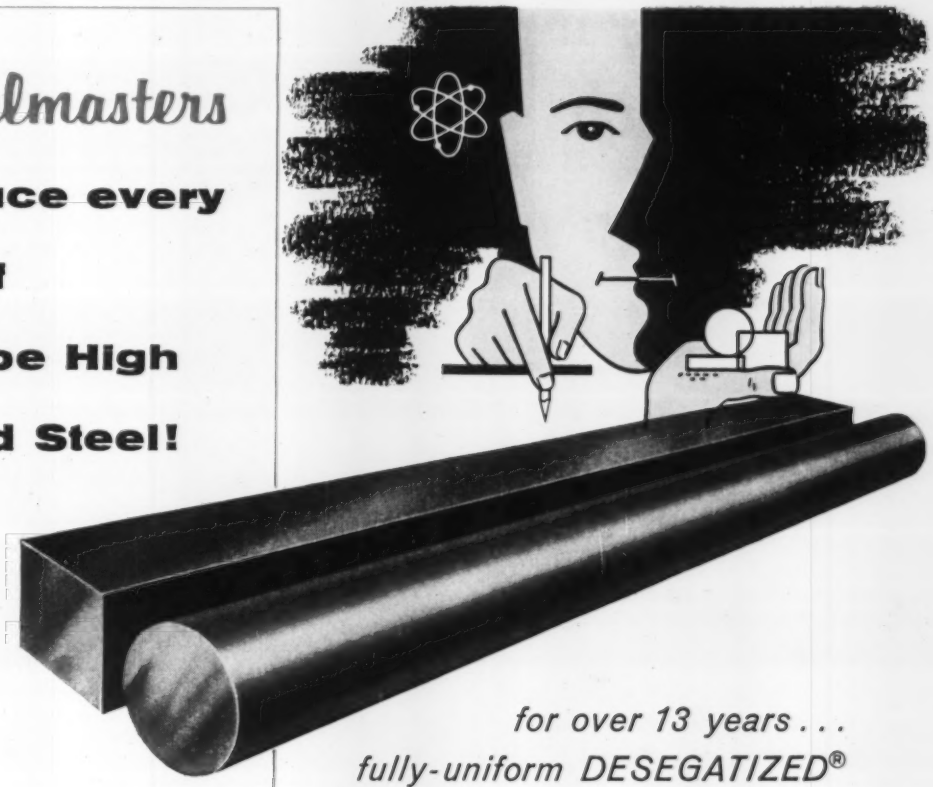

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Roger Blough Urges Halt to 'Cost-Push Inflation'

"HOLD THAT LINE IN '59!" If there is one banner under which we should all unite to halt "cost-push inflation," that is it, declares Roger M. Blough, chairman of U. S. Steel Corp.

"This year, unless we can prevent it, the probability is that we shall go orbiting off on another great round of inflation, as unions in a dozen major industries make wage demands that exceed any conceivably possible increase in national productive efficiency," he warns.

• **Billion Worth Nothing**—Speaking of the "billion dollar bundle" of new money which the steelworkers' union is advertising as its goal in the upcoming negotiations, Mr. Blough emphasizes: "That is precisely what it would be in the end—new money, fresh off the printing press and worth exactly that! . . . Unhappily for all of us, you don't find a billion dollar bundle in a 5 and 10 cent store."

Debate in the next few months will center on two assumptions, he feels: 1. New wage demands can be met out of increased productivity and will not be inflationary. 2. Rising corporate profits, rather than wage increases, are the cause of mounting living costs.

Mr. Blough disclaims both assumptions.

• **Productivity Overstated**—Output per manhour is an unrealistic measure of productivity because it does not take into account the increased cost of machines or materials that make higher output possible. Such a term usually exaggerates any real increase that takes place. Also, it cannot be measured over a short term of a month, a few months, or even a few years, Mr. Blough claims.

He points out that from 1940 through 1957, hourly employment costs in the steel industry have gone up an average of 7.6 per cent a year. At the same time, Department of Labor figures show that output per manhour has gained only 2.6 per cent. "The difference spelled wage inflation."

• **Profits Decline**—Turning to profits, the steel executive maintains that only twice during the present decade have after-tax corporate profits been as high as they were in 1950. In 1958, they were $5 billion less than they were in 1950. At the same time, government reports show that compensation of employees has jumped by $100 billion nationally.

"When we hear union leaders say that higher wage costs can—and should—come out of profits, let us remember one little economic maxim: That less profit means fewer tools—or poorer tools—of production; and that in turn means less efficiency, higher production costs, higher prices, shrinking purchasing power, diminishing markets, and fewer jobs."

• **Stacked Deck**—Mr. Blough feels that "at the American bargaining table . . . the power that is concentrated on the labor side normally outweighs by a considerable margin that on the management side." This has resulted in five steel industry strikes in the last 13 years. "The steel companies have taken these costly strikes in an effort to help check the rising tide of wage-cost inflation; but they have never succeeded in doing so." Pressures mount from customers, the public, and frequently the government itself. "'Settle,' they tell us; and settle we must."

Transformer Prices Cut

Distribution transformer prices have been revised (effective Mar. 23) by General Electric Co., Schenectady, N. Y. The over-all result: A reduction.

Prices of higher voltage, single phase distribution transformers were reduced; prices of some larger kilovolt-ampere, single phase and three phase, pole type units were increased.

The company said the move reflects the utility industry's greater usage of higher voltage and fewer standard transformer ratings.

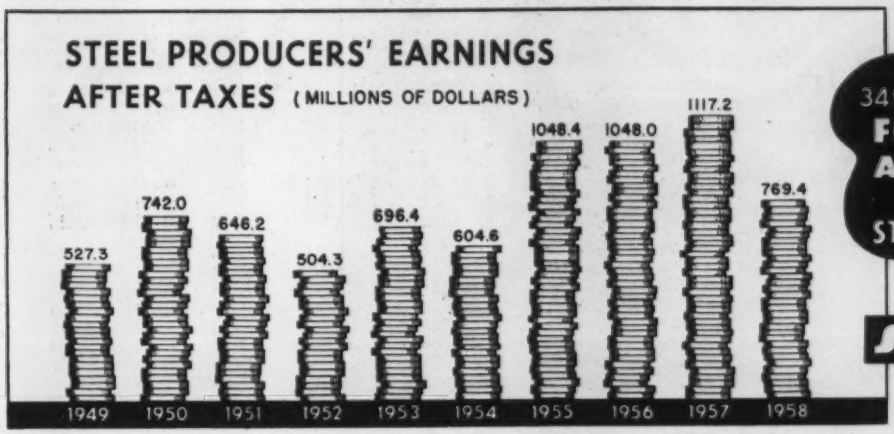
Kiewit Gets Nuclear Job

Peter Kiewit Sons' Co., Omaha, Nebr., is general contractor for the nuclear portion of a power facility at Hallam, Nebr.

The work to be done under this contract will cost an estimated $9 million.

The Atomic Energy Commission and Consumers Public Power District of Nebraska have entered into a co-operative construction arrangement. It will include a sodium-cooled, graphite moderated reactor, designed to produce 75,000 net kilowatts of electricity. Cost of the reactor portion will be about $29 million. Consumers will bear $5,220,000 of this cost, provide the site and turbogenerator.

The plant will be operated by Consumers as part of its generating system. Atomics International, a division of North American Aviation Inc., Los Angeles, is responsible for nuclear design and procurement of major reactor components.



34th ANNUAL
FINANCIAL ANALYSIS
OF THE
STEEL INDUSTRY

Supplement to
STEEL
March 30, 1959

Steel Industry Financially Sound

THE STEEL INDUSTRY entered 1959 better off financially in many ways than it was a year earlier despite the recession which cut deeply into both sales and profits.

Working capital was at an all-time high of $3,362,593,678 for the 33 companies represented in STEEL's 34th Financial Analysis of the Steel Industry. (They account for 94.15 per cent of the industry's capacity.) The gain was a result of a significant decline in current liabilities, compared with only a minor falloff in current assets. The ratio of current assets to current liabilities rose from 2.46 to 1 in 1957 to 2.63 to 1 last year, which is the best figure since 1954.

Also indicative of the industry's sound position and continuing growth is the 3.92 per cent increase in total assets. A large part of this rise is accounted for by the 5.5 per cent hike in ingot capacity from Jan. 1, 1957, to Jan. 1, 1958. Total capitalization advanced 5.69 per cent to a new high of $11.6 billion.

Despite an otherwise sound financial picture, 1958 was far from a banner year for sales and profits. With operations averaging only 60.75 per cent of capacity, sales dropped 21 per cent to $12.1 billion. But of every sales dollar, the industry managed to keep only 6.36 cents as net profit, the lowest figure since 1954. Total net income for the 33 companies declined 31 per cent to $769.4 million, ending a string of three years in which the industry netted over $1 billion.

Of the 33 companies participating, 27 fell below their 1957 profit levels, while six managed to improve their positions. For the first time in four years, net losses were reported by two companies.

But if the steelmakers' earnings slipped last year, so did Uncle Sam's. Federal income taxes fell 33.7 per cent to $721.9 million, again the lowest since 1954.

Ownership of the steel industry continued to expand in 1958, with 28,399 more persons owning common stock than a year ago. The number of shares of common outstanding (excluding Barium Steel Corp.) is considerably higher than on Jan. 1, 1957. Two-thirds of the participants showed increases, but a 1-for-4 reverse split by Barium resulted in a decline in the industry total.

Evidence of the faith of the industry in the future is seen from the fact that common stock dividends remained firm for the most part. Twelve firms continued to pay their 1957 rates; three gave stock dividends; and three even increased their payments. However, net earnings per share for five of the companies did not cover their dividend payments.

A significant increase in the valuation of Kaiser Steel Corp.'s preferred stock tends to cover up the continued trend in the reduction of such stock by the rest of the industry. All other companies with preferred either held the line at the 1957 levels or reduced both valuation and number of stockholders.

Twenty-two steelmakers managed to cut back their long term debt in 1958, but the reductions were minor compared with the increases made by the other 11. The biggest change was made by U. S. Steel Corp., which more than doubled its debt with the issuance of $300 million of sinking fund debentures last July. Only two companies were without long term debt last year compared with four in 1957.

Thirty-one of the companies operated with fewer employees in 1958, and all but seven cut down on total employment costs. McLouth Steel Corp. and Eastern Stainless Steel Corp. increased their payrolls.

It should be noted that the companies with the best relative standing in 1958 were smaller producers, particularly stainless steelmakers and wiremakers. Of the six which showed better profits last year, two are stainless producers and three primarily make wire.

THIS SPECIAL REPORT is compiled from data supplied by 33 producers representing 94.15 per cent of the steelmaking capacity in the U. S.

Bold face type is used under those columns in which figures from all 33 companies were not received.

	Rated Ingot Capacity Net Tons		Ingot Production Net Tons		Steel Operating Rate, Per Cent		Net Income Per Ton Ingots Produced	
	1958	1957	1958	1957	1958	1957	1958	1957
United States Steel Corp.	40,212,000	39,582,000	23,818,889	33,737,735	59.23	85.24	$12.66	$12.43
Bethlehem Steel Corp.	23,000,000	20,500,000	13,393,034	19,123,201	58.23	93.28	10.28	9.99
Republic Steel Corp.	12,242,000	11,047,000	6,430,283	8,484,615	52.50	76.80	9.63	10.02
Jones & Laughlin Steel Corp.	7,500,000	6,900,000[3]	4,947,000	6,048,000	65.96	87.65	4.69	7.52
National Steel Corp.	6,800,000	6,200,000	4,476,238	5,326,425	65.83	85.91	8.00	8.55
Youngstown Sheet & Tube Co.	6,500,000	6,240,000	3,659,482	5,137,834	56.30	82.30	5.88	8.27
Armco Steel Corp.[7]	6,394,200	6,000,200	4,506,127	5,423,592	70.47	90.39	12.76	12.59
Inland Steel Co.	5,800,000	5,500,000	4,714,904	5,502,707	81.29	100.05	10.15	10.70
Colorado Fuel & Iron Corp.	2,836,500	2,799,500	1,706,308	2,163,594	60.16	77.29	1.26	6.58
Wheeling Steel Corp.	2,400,000	2,200,000	1,580,214	1,828,534	65.84	83.12	5.63	6.61
Sharon Steel Corp.	1,989,000[11]	1,898,000	779,281	1,204,283	39.78[12]	63.45	0.29	3.36
McLouth Steel Corp.	1,574,000	1,574,000	1,396,103	1,534,240	88.70	97.47	7.16	6.13
Kaiser Steel Corp.	1,536,000	1,536,000	1,466,278	1,590,322	95.46	103.54	3.70	13.48
Detroit Steel Corp.	1,500,000	1,500,000	447,613	562,477	29.84	37.50	2.58	5.34
Crucible Steel Co. of America	1,424,530	1,423,400	710,823	926,209	49.90	65.07	6.01	7.06
Pittsburgh Steel Co.	1,416,000	1,320,000	955,593	1,223,534	61.26[15]	92.69	0.91‡	3.40
Granite City Steel Co.	1,200,000	1,200,000	1,106,556	1,116,698	92.21	93.06	8.47	8.94
Allegheny Ludlum Steel Corp.	864,200	864,200	418,254	495,280	48.40	57.31	13.97	23.53
Barium Steel Corp.[23]	846,760	846,760	226,110	585,993	26.70	69.20	[24]	[24]
Northwestern Steel & Wire Co.[22]	825,000	825,000	473,561	703,752	57.40	85.30	10.66	7.43
Alan Wood Steel Co.	800,000	800,000	505,341	655,536	63.17	81.94	4.17	3.13
Lukens Steel Co.	750,000	750,000	602,996	758,212	80.40	101.09	6.94	13.35
Copperweld Steel Co.	660,000	660,000	[24]	[24]	[24]	[24]	[24]	[24]
Lone Star Steel Co.	660,000	550,000	384,475	666,853	58.25	121.25	2.77	16.99
Laclede Steel Co.	600,000	520,000	454,693	452,005	75.78	86.92	8.15	8.49
Universal-Cyclops Steel Corp.[17]	577,410	577,410	376,719	382,516	65.24	66.25	9.09	10.63
Keystone Steel & Wire Co.	450,000	450,000	366,793	395,236	81.51	87.83	18.37	16.44
Continental Steel Corp.	420,000	420,000	308,248	338,508	73.39	80.60	12.61	8.14
Atlantic Steel Co.	400,000	400,000	146,643	229,807	36.66	57.45	2.41	1.52
Carpenter Steel Co.[30]	170,602	86,602	55,800	77,574	38.19[31]	89.58	13.79	88.16
Eastern Stainless Steel Corp.	80,000	50,000	48,607	36,214	60.76	72.43	52.17	50.59
Vanadium-Alloys Steel Co.[32]	42,000	42,000	9,736	18,578	23.18	44.23	122.82	145.76
Jessop Steel Co.	35,800	35,740	18,443	28,007	51.52	78.36	34.91	37.92
Totals (or averages)	132,506,002	125,297,812	80,491,145	106,758,071	60.75	85.20	$9.56	$10.46

	Number of Shares of Common Stock Outstanding		Common Stock Valuation		Preferred Stock Valuation	
	1958	1957	1958	1957	1958	1957
United States Steel Corp.	53,828,122	53,753,622	$897,135,367	$895,893,700	$360,281,100	$360,281,100
Bethlehem Steel Corp.	45,087,548	44,644,188	540,734,955	524,594,305	93,388,700	93,388,700
Republic Steel Corp.	15,635,759	15,595,101	156,462,211	156,055,631	None	None
Jones & Laughlin Steel Corp.	7,796,354	7,785,316	77,482,000	77,490,000	29,357,000	29,357,000
National Steel Corp.	7,466,281	7,425,622	74,662,810	74,256,220	None	None
Youngstown Sheet & Tube Co.	3,452,598	3,441,648	111,173,885	110,624,638	None	None
Armco Steel Corp.[7]	14,783,537	14,494,742	147,835,367	144,947,423	None	None
Inland Steel Co.	5,755,921	5,692,763	109,945,512	105,574,831	None	None
Colorado Fuel & Iron Corp.	3,452,153	3,384,463	17,178,093	16,839,641	8,977,794	9,778,736
Wheeling Steel Corp.	1,936,677	1,936,653	19,366,770	19,366,530	34,758,000	35,230,600
Sharon Steel Corp.	1,102,501	1,100,000	11,085,400	11,060,390	None	None
McLouth Steel Corp.	1,489,130	1,487,000	3,722,825	3,717,500	25,745,150	29,389,550
Kaiser Steel Corp.	3,264,462	3,249,500	3,264,462	3,249,500	57,089,625	37,875,375
Detroit Steel Corp.	3,012,423	3,021,382	3,012,423	3,021,832	3,600,000	4,050,000
Crucible Steel Co. of America	3,793,586	3,791,486	47,419,825	47,393,581	None	None
Pittsburgh Steel Co.	1,585,890	1,585,890	15,858,900	15,858,900	24,194,300	24,194,300
Granite City Steel Co.	2,129,549[20]	2,127,717[20]	26,619,956	26,597,456	1,607,300	1,965,800
Allegheny Ludlum Steel Corp.	3,856,008	3,852,790	3,856,008	3,852,790	None	None
Barium Steel Corp.[23]	1,037,241	4,149,495	4,148,964	4,149,495	None	None
Northwestern Steel & Wire Co.[22]	2,502,113	2,502,113	12,510,565	12,510,565	None	None
Alan Wood Steel Co.	696,007	696,007	6,960,070	6,960,070	4,839,800	4,839,800
Lukens Steel Co.	953,928	953,928	3,179,760	3,179,760	None	None
Copperweld Steel Co.	1,101,889	1,086,191	5,509,445	5,430,955	2,265,300	2,445,950
Lone Star Steel Co.	3,206,300	3,194,400[26]	3,206,300	3,194,400[26]	None	None
Laclede Steel Co.	206,250	206,250	4,125,000	4,125,000	None	None
Universal-Cyclops Steel Corp.[17]	1,679,058	1,625,584	1,679,058	1,593,417	None	None
Keystone Steel & Wire Co.	1,875,000	1,875,000	2,604,167	2,604,167	None	None
Continental Steel Corp.	516,401	516,401	7,229,614	7,229,614	None	None
Atlantic Steel Co.	396,500	396,500	2,000,000	2,000,000	700,000	700,000
Carpenter Steel Co.[30]	898,355	854,496	4,491,775	4,272,480	None	None
Eastern Stainless Steel Corp.	718,307	717,307	3,591,535	3,586,535	None	None
Vanadium-Alloys Steel Co.[32]	623,870	560,950	3,130,000	2,830,000	None	None
Jessop Steel Co.	599,508	570,419	599,508	570,419	None	None
Totals (or averages)	196,439,226	198,274,924	$2,331,782,530	$2,304,631,745	$646,804,069	$633,496,911

*Credit. ‡Deficit. NA=Not Available.

[1] Excluding amount maturing within one year.

[2] After federal income taxes but before interest on long term debt.

[3] Including 300,000 net tons of Rotary Electric Steel Co. transferred Apr. 30, 1957.

[4] Plus stock dividend of 3 per cent.

[5] Based on average capitalization.

[6] Includes set-asides of $10,565,000 in 1958 and $6,810,000 in 1957 for future income taxes.

[7] For comparative purposes, 1957 has been restated to include National Supply Co.

[8] Includes two classes of preferred stock.

FINANCIAL ANALYSIS OF

Net Income Per Ton Ingot Capacity 1958	1957	Capitalization Per Ton Ingot Capacity 1958	1957	Average Number Employed 1958	1957	Total Employment Costs 1958	1957	Long Term Debt[3] 1958	1957	Surplus 1958	
$7.50	$10.60	$89.56	$81.21	223,490	271,037	$1,488,523,225	$1,861,945,136	$487,565,195	$216,547,272	$1,856,569,230	$1,74
5.99	9.32	77.67	85.76	143,024	167,328	857,701,078	1,000,684,128	159,883,500	171,212,500	992,497,965	9
5.06	7.70	66.29	69.99	51,622	65,110	350,928,262	433,315,252	98,158,550	75,983,700	556,853,360	5
3.09	6.59	87.78	93.87	38,754	43,948	259,801,000	287,022,000	143,287,000	135,071,000	408,254,000	4
5.27	7.34	83.37	88.87	23,513	27,444	182,223,804	198,589,029	112,076,555	111,790,998	380,149,921	3
3.31	6.81	85.14	85.23	25,349	30,287	166,301,063	192,483,794	112,250,000	95,500,000	329,976,887	3
8.99	11.38	116.43	120.98	37,192	41,652	270,481,289	288,390,244	107,056,000	114,291,000	489,580,922	4
8.25	10.70	104.28	105.96	28,211	29,227	186,057,673	184,822,125	171,410,000	175,814,900	323,445,618	3
0.76	5.09	69.00	70.41	19,001	22,512	125,498,290	141,712,953	49,708,000	51,937,000	119,864,788	1
3.71	5.49	98.93	107.75	11,320	13,253	92,520,540	101,675,755	39,032,800	41,469,900	144,283,105	1
0.11	2.13	45.38	48.51	6,362	8,087	37,859,332	47,075,422	11,800,000	13,200,000	67,379,042[13]	
6.35	5.98	103.28	97.25	3,846	3,493	26,972,932	25,841,947	75,546,000	70,913,000	57,550,505	
3.53	13.96	265.61	242.92	9,972	11,212	69,116,000	75,206,000	243,933,293	229,515,123	103,682,885	1
0.77	2.00	54.48	56.56	3,113	3,858	21,875,507	25,878,062	22,000,000	24,000,000	53,110,795	
3.00	4.60	99.78	99.24	12,390	15,453	83,474,000	92,979,000	23,472,000	25,018,772	71,243,354	
0.61‡	3.15	84.76	94.09	8,259	9,689	57,912,393	68,472,939	31,000,000	33,002,895	48,966,001	
7.81	8.32	103.23	99.02	4,912	4,943	33,639,735	30,980,539	37,291,000	37,800,000	58,352,816	
6.76	13.48	163.61	167.77	11,400	14,800	83,259,851	100,436,494	36,124,200	37,936,200	101,412,362	1
24	24	24	24	2,496	4,250	12,515,892	23,463,472	9,527,141	10,113,000	18,491,995	
6.12	6.33	47.52	43.67	2,399	2,937	17,910,451	21,195,852	7,245,561	7,865,055	19,449,016	
2.64	2.57	47.78	47.91	3,362	3,798	22,737,042	24,625,872	4,537,052	6,020,000	21,890,370	
5.58	13.49	85.04	57.40	4,947	5,650	36,160,875	40,142,461	20,500,000	2,050,000	40,096,987	
24	24	24	24	4,811	5,294	34,326,712	36,475,922	11,525,485	11,979,667	36,765,495	
1.61	20.60	151.36	187.64	2,216	3,078	23,333,425	27,654,634	50,176,099	54,800,000	46,517,315	
6.17	7.38	53.56	58.24	3,433	3,510	22,871,928	20,988,058	3,800,000	4,000,000	24,212,753	
5.93	7.04	107.45	95.89	4,763	5,514	32,200,262	34,542,889	11,555,707	7,108,000	48,805,318	
14.97	14.44	91.77	85.13	2,603	2,660	19,909,097	18,365,411	None	None	38,690,355	
9.26	6.56	65.64	61.17	2,490	2,568	14,811,206	13,852,632	1,800,000	2,000,000	18,540,438	
0.88	0.87	32.23	31.46	1,276	1,838	8,174,086	10,749,144	None	None	10,192,199	
5.27[31]	78.97	267.00	417.31	3,388	3,417	20,884,109	22,943,775	6,000,000	None	35,058,814	
31.70	36.64	353.64	513.45	1,224	1,147	9,738,120	9,700,479	5,123,600	4,000,000	19,575,861	
28.47	64.48	370.72	410.26	1,555	1,557	7,356,745	8,844,514	2,500,000	None	15,570,248	
17.99	29.71	338.89	333.55	1,190	1,230	7,504,520	8,484,251	1,332,800	1,768,802	10,199,871	
$5.81	$8.92	$87.87	$87.92	703,883	831,781	$4,684,580,444	$5,479,540,185	$2,097,217,538	$1,772,708,784	$6,567,230,591	$6,3

Book Value Per Share of Common Stock 1958	1957	Number of Common Stockholders 1958	1957	Number of Preferred Stockholders 1958	1957	Preferred Dividend Requirements 1958	1957	Net Earnings Per Common Share 1958	1957	Dividends Per Share on Preferred 1958	1957	Dividend Share on 1958	
$51.16	$49.07	263,311	266,962	62,957	64,267	$25,219,677	$25,219,677	$5.13	$7.33	$7.00	$7.00	$3.00	
34.01	33.45	171,010	145,654	18,674	19,142	6,537,209	6,537,209	2.91	4.13	7.00	7.00	2.40	
45.62	44.71	91,969	94,891	None	None	None	None	3.96	5.45	None	None	3.00	
62.30	62.07	52,066	49,542	5,873	5,913	1,468,000	1,468,000	2.79	5.65	5.00	5.00	2.50	
60.92	59.15	NA	NA	None	None	None	None	4.80	6.13	None	None	3.00	
127.77	126.78	17,365	17,395	None	None	None	None	6.23	12.35	None	None	5.00	
43.12	42.29	72,305	71,130	None	None	None	None	3.89	4.71	None	None	3.00	
75.29	71.49	26,400	27,928	None	None	None	None	8.32	10.34	None	None	4.50	
39.70	40.01	23,894	23,829	1,896	2,067	525,650	557,402	0.47	4.04	5.25[8]	5.25[8]	9	
84.50	82.79	12,536	12,354	4,848	4,880	1,737,900	1,761,530	3.70	5.33	5.00	5.00	2.00	
71.17	71.69	9,237	9,177	None	None	None	None	0.20	3.68	None	None	0.80	
41.15	35.49	4,807	4,695	1,174	1,332	1,590,197	1,432,129	5.65	5.37	7.625[33]	4.725[33]	None	
32.76	32.54	7,370	6,853	12,491	12,728	2,941,900	2,229,496	0.76	5.91	1.73[8]	1.46	0.40	
18.63	18.79	7,410	7,245	2	2	230,250	287,500	0.31	0.90	6.00	6.00	0.50	
31.28	30.66	14,168	13,470	None	None	None	None	1.13	1.73	None	None	0.50	
40.88	42.25	5,635	5,581	2,902	2,941	1,308,148	1,308,150	1.37‡	1.80	10.50[8]	10.50[8]	None	
39.90	37.16	11,272	11,773	1	1	93,331	112,812	4.36	4.64	5.50	5.50	1.60	
27.30	27.79	19,678	19,609	None	None	None	None	1.52	3.02	None	None	2.00	
21.83	6.14	14,649	15,479	None	None	None	None	1.90‡	0.74	None	None	None	
12.77	11.25	1,321	1,262	None	None	None	None	2.02	2.09	None	None	0.50	
41.45	39.47	1,692	1,789	581	589	241,990	241,990	2.68	2.60	5.00	5.00	0.70	
45.37	42.98	3,300	3,040	None	None	None	None	4.38	10.61	None	None	2.00	
38.37	37.80	7,888	8,375	722	778	138,356	156,046	1.76	2.41	5.50[8]	5.00[8]	1.00	
15.51	15.15[26]	15,034	11,573	None	None	None	None	0.33	3.55[26]	None	None	27	
137.40	127.44	1,691	1,628	None	None	None	None	17.96	18.61	None	None	8.00	
30.07	29.69	2,651	2,041	None	None	None	None	2.04	2.50	None	None	0.80	
22.02	20.43	4,425	4,254	None	None	None	None	3.59	3.47	None	None	2.00	
49.90	45.87	3,123	3,155	None	None	None	None	7.53	5.34	None	None	3.50	
30.75	29.97	2,313	2,555	264	264	45,997	45,997	0.77	0.76	7.00	7.00	None	
44.03	42.29	6,349	3,666	None	None	None	None	0.86	8.00	None	None	3.00	
32.25	30.21	3,793	3,709	None	None	None	None	3.53	2.55	None	None	1.50	
29.97	30.72	2,712	2,421	None	None	None	None	1.92	4.83	None	None	2.60	
18.01	17.80	4,490	4,430	None	None	None	None	1.07	1.86	None	None	34	
....	....	885,864	857,465	112,385	114,904	$42,078,605	$41,357,938	$3.92	$5.63	....	....	....	

[9] Stock dividend of 2 per cent.
[10] Includes set-asides of $170,300 in 1958 and $585,800 in 1957 for future income taxes.
[11] Includes 91,000 net tons added on May 1, 1958.
[12] Based on average annual capacity.
[13] Includes $700,000 of deferred income tax payments.
[14] Includes $1,825,000 special credit from prior years.
[15] Based on capacity of 1,560,000 net tons at yearend.
[16] Includes set-asides of $1,250,000 in 1958 and $3,950,000 in 1957 for future income taxes.
[17] For comparative purposes, 1957 has been restated to include Empire-Reeves Steel Corp.
[18] Plus stock
[19] For 1958, $692,000 fo of $2,260,0
[20] Excludes 4
[21] Includes se for future

OF THE STEEL INDUSTRY FOR

Surplus 1957	Total Capitalization 1958	Total Capitalization 1957	Provision for Depreciation, Depletion 1958	Provision for Depreciation, Depletion 1957	Total Income—Per Cent of Capitalization[2] 1958	Total Income—Per Cent of Capitalization[2] 1957	Interest on Long Term Debt 1958	Interest on Long Term Debt 1957
29,230	$1,741,644,377	$3,601,550,892	$3,214,366,449	$204,899,055	$276,008,777	8.69	13.27	$11,471,668	$7,006,42
97,965	968,809,371	1,786,505,120	1,758,004,876	108,655,366	110,656,878	8.07	11.29	6,340,001	7,467,83
53,360	541,151,244	811,474,121	773,190,575	33,074,198	40,787,933	7.95	11.16	2,619,822	1,261,44
54,000	405,776,000	658,380,000	647,694,000	48,038,000	44,227,000	4.24	7.75	4,729,000	4,759,00
49,921	364,957,597	566,889,286	551,004,815	39,350,724	46,266,264	7.01	8.97	3,932,260	3,932,26
76,887	325,721,488	553,400,772	531,846,126	29,662,816	40,337,908	4.64[5]	8.88[5]	3,680,668	3,226,30
30,922	466,657,233	744,472,289	725,895,656	34,456,960	38,430,193	8.23	9.79	3,749,417	2,736,91
95,618	301,384,563	604,801,130	582,774,294	29,752,455	25,985,912	8.93	10.95	6,148,542	4,944,57
54,788	118,560,389	195,728,675	197,115,766	13,176,766	11,703,979	2.64	8.83	3,011,602	3,170,10
83,105	140,974,053	237,440,675	237,041,083	14,697,131	15,369,129	4.31	5.71	1,332,882	1,455,49
79,042[13]	67,802,573	90,264,442	92,062,963	3,678,381	4,038,504	0.85	4.83	546,399	398,88
50,505	49,049,716	162,564,480	153,069,766	13,588,974	12,604,788	7.40	7.18	4,248,641	3,283,64
82,885	102,486,518	407,970,265	373,126,516	17,825,807	15,879,598	4.29	7.71	12,084,804	7,324,87
10,795	53,772,714	81,723,218	84,844,546	4,726,999	4,674,552	2.98	5.22	1,283,893	1,428,35
43,354	68,845,039	142,135,179	141,257,392	9,248,738	11,039,847	3.67	5.39	934,472	1,063,42
66,001	51,139,742	120,019,201	124,195,837	7,705,900	6,756,677	0.62	4.61	1,613,198	1,565,78
52,816	52,464,121	123,871,072	118,827,377	4,953,639	4,868,875	9.07	9.62	1,864,754	1,443,81
12,362	103,201,984	141,392,570	144,990,974	9,628,709	11,006,453	5.15	9.03	1,438,827	1,434,02
91,995	21,313,260	32,168,100	35,575,755	2,208,478	2,606,560	4.07[1]	10.20	655,941	567,46
49,016	15,650,183	39,205,142	36 025,803	2,241,295	1,791,594	13.96	15.57	432,211	382,96
90,370	20,510,362	38,227,292	38,330,232	3,822,587	4,136,775	6.30	6.24	297,494	336,46
96,987	37,822,857	63,776,747	43,052,617	2,114,125	1,805,708	6.56	23.97	None	203,48
55,495	35,623,754	56,065,725	55,480,326	2,934,751	2,610,111	4.74	5.90	577,117	505,66
17,315	45,208,678[26]	99,899,714	103,203,078	4,693,713	4,074,634	3.80	13.67	2,729,782	2,775,93
12,753	22,158,502	32,137,753	30,283,502	1,497,801	1,403,965	12.10	13.16	185,000	149,66
05,318	46,665,167	62,040,083	55,366,584	3,866,948	4,112,596	5.94	7.63	563,898	340,83
90,355	35,703,836	41,294,522	38,308,003	1,170,204	1,251,605	16.31	16.96	None	Non
40,438	16,460,207	27,570,052	25,689,821	1,353,381	1,328,034	14.39	11.07	80,750	88,25
92,199	9,884,961	12,892,199	12,584,961	658,207	843,951	2.74	2.77	None	Non
58,814	31,867,436	45,550,589	36,139,916	2,818,425	2,132,883	2.11	18.92	192,000	Non
75,861	18,085,723	28,290,996	25,672,258	1,108,967	769,451	9.80	8.19	236,525	271,85
70,248	14,401,053	21,200,248	17,231,053	368,462	325,849	5.65	15.72	1,320	Non
99,871	9,581,894	12,132,179	11,921,115	275,942	275,626	6.24	9.65	113,072	87,95
30,591	$6,305,336,595	$11,643,034,728	$11,016,174,035	$658,253,904	$750,112,609	6.22	9.99	$77,086,960	$63,613,68

Dividends Per Share on Common 1958	Dividends Per Share on Common 1957	Federal Income Taxes 1958	Federal Income Taxes 1957	Total Assets 1958	Total Assets 1957	Current Assets 1958	Current Assets 1957
$3.00	$3.00	$285,000,000	$406,000,000	$4,436,836,950	$4,074,070,018	$1,423,121,359	$1,433,055,907
2.40	2.40	131,000,000	175,000,000	2,195,045,817	2,260,340,071	1,032,662,441	1,114,087,666
3.00	3.00	60,500,000	89,600,000	962,981,434	929,821,851	367,820,469	343,191,591
2.50	2.50[4]	18,090,000	39,901,000	1,263,397,000	1,225,686,000	261,491,000	261,030,000
3.00	4.00	35,000,000	43,550,000	687,068,257	670,815,521	222,415,590	202,591,508
5.00	5.00	20,088,000[6]	39,066,000[6]	660,160,264	636,007,884	310,822,853	292,061,441
3.00	3.00	55,860,180	69,039,571	896,936,406	873,574,689	467,881,403	425,107,286
4.50	4.50	42,440,000	60,555,000	686,200,216	663,103,193	219,689,478	259,698,548
9	2.00	2,468,500[10]	14,926,000[10]	267,911,968	274,556,183	113,874,713	127,328,512
2.00	3.40	6,954,000	10,116,000	280,103,787	284,061,273	117,754,498	122,065,805
0.80	3.00	190,000*	3,380,000	105,265,204	106.504.200	52,301,057	52,492,256
None	None	2,430,000	5,562,000	194,021,878	175,959,206	75,381,741	59,807,855
0.40	0.40	2,175,000[16]	9,300,000[16]	481,950,038	448,649,816	89,865,678	116,768,101
0.50	1.00	1,250,000	3,346,000	108,346,407	108,536,541	35,555,402	32,557,955
0.50	1.60	2,315,000	5,630,000	170,619,863	167,308,378	85,761,976	74,736,034
None	1.00[18]	1,418,000[19]	3,976,000[19]	161,047,966	157,994,163	57,460,719	52,123,580
1.60	3.00	10,127,000[21]	10,829,000[21]	166,611,894	158,997,476	54,092,353	50,279,460
2.00	2.00	6,174,000	13,441,000	166,887,541	175,582,424	86,241,099	88,767,047
None	0.30[25]	2,185,396*	3,536,000	46,002,365	52,018,642	23,251,195	28,603,194
0.50	0.80	5,840,000	6,030,000	55,939,181	52,112,566	20,868,384	16,786,663
0.70	1.40	997,000	1,047,000	53,087,991	48,653,613	19,385,835	14,815,639
2.00	3.40	4,255,000	11,700,000	78,678,654	57,747,429	30,861,537	33,306,035
1.00	2.00	2,175,000	2,500,000	74,161,919	68,895,399	39,171,825	34,329,646
27	27	600,000[28]	11,570,000[28]	135,228,362	134,125,378	49,031,801	46,946,850
8.00	8.00	4,075,000	4,675,000	38,879,951	36,113,540	22,953,412	20,473,090
0.80	0.93	3,320,000	4,119,000	73,110,896	66,504,557	32,608,693	32,624,731
2.00	2.00	6,992,003	6,393,924	56,881,737	53,632,244	18,462,596	20,076,442
3.50	2.00[29]	4,400,000	3,130,000	32,738,185	29,920,552	17,501,948	14,887,913
None	0.50	241,000	327,000	21,078,228	22,663,789	7,557,994	8,500,689
3.00	2.80	3,365,000	7,436,000	53,145,092	47,497,252	23,197,147	30,777,370
1.50	1.50	2,720,000	2,180,000	35,877,776	31,386,228	25,315,257	20,798,901
2.60	2.30	1,199,000	2,907,000	23,516,895	22,573,862	12,663,446	14,183,508
34	34	816,000	1,315,000	14,320,066	14,066,732	8,563,000	8,592,875
....	....	$721,909,287	$1,072,083,495	$14,684,040,188	$14,129,480,670	$5,425,587,899	$5,453,454,098

[13] Plus stock dividend of 4 per cent.
[18] For 1958, includes tax credit of $1,418,000 and set-aside of $692,000 for future income taxes. For 1957, includes set-aside of $2,260,000 for future income taxes.
[20] Excludes 48 shares in 1958 and 80 shares in 1957 in scrip.
[21] Includes set-asides of $197,000 in 1958 and $2,388,000 in 1957 for future income taxes.
[22] Fiscal year ended July 31.
[28] Figures for 1958 reflect a 1-for-4 reverse split of common stock on May 9, 1958.
[24] Comparisons would be misleading because company's operations include fabricating divisions with no steel ingot capacity.
[25] Plus stock dividend of 2 per cent.

R 1958

Compiled by **STEEL**

March 30, 1959

7	Net Sales 1958	Net Sales 1957	Net Profit—Per Cent of Net Sales 1958	Net Profit—Per Cent of Net Sales 1957	Net Income 1958	Net Income 1957	
5,422	$3,472,177,091	$4,413,806,173	8.68	9.50	$301,558,231	$419,406,956	..... United States Steel Corp.
7,835	2,024,282,732	2,624,913,123	6.80	7.28	137,741,946	191,025,933	..... Bethlehem Steel Corp.
1,442	910,382,817	1,227,257,507	6.80	6.93	61,921,680	85,014,422	..... Republic Steel Corp.
0,000	654,060,000	837,568,000	3.55	5.43	23,198,000	45,452,000	..... Jones & Laughlin Steel Corp.
2,260	539,957,294	640,967,342	6.64	7.10	35,827,414	45,518,884	..... National Steel Corp.
5,302	506,959,574	688,611,592	4.24	6.17	21,501,320	42,508,579	..... Youngstown Sheet & Tube Co.
5,910	867,390,909	1,073,705,249	6.63	6.36	57,512,151	68,297,928	..... Armco Steel Corp.[7]
1,576	661,253,596	772,380,683	7.24	7.62	47,869,042	58,876,875	..... Inland Steel Co.
0,107	276,163,902	340,755,160	0.78	4.18	2,147,223	14,236,851	..... Colorado Fuel & Iron Corp.
5,495	221,009,355	249,756,955	4.03	4.84	8,899,267	12,077,696	..... Wheeling Steel Corp.
3,884	99,970,977	151,651,824	0.23	2.67	224,942	4,046,773	..... Sharon Steel Corp.
3,644	171,590,704	179,759,232	5.83	5.23	9,998,374	9,409,977	..... McLouth Steel Corp.
3,870	181,385,288	208,619,403	2.99	10.28	5,422,271[14]	21,438,507	..... Kaiser Steel Corp.
1,355	61,781,666	82,543,525	1.87	3.64	1,153,692	3,004,382	..... Detroit Steel Corp.
4,427	186,363,233	235,938,306	2.29	2.77	4,274,793	6,543,594	.... Crucible Steel Co. of America
5,788	134,475,314	183,260,331	0.64‡	2.27	865,593‡	4,155,000	..... Pittsburgh Steel Co.
3,818	125,272,603	123,763,490	7.48	8.07	9,373,580	9,984,451	..... Granite City Steel Co.
0,023	202,572,808	267,647,586	2.89	4.35	5,844,803	11,651,851	..... Allegheny Ludlum Steel Corp.
7,468	27,614,634	83,885,112	7.12‡	3.65	1,966,545‡	3,062,998	..... Barium Steel Corp.[33]
2,965	60,468,595	78,105,122	8.35	6.69	5,049,890	5,225,418	.. Northwestern Steel & Wire Co.[22]
5,462	54,163,265	67,889,893	3.89	3.03	2,109,203	2,054,046	..... Alan Wood Steel Co.
3,486	99,256,110	130,473,207	4.21	7.76	4,181,986	10,119,998	..... Lukens Steel Co.
5,669	93,526,153	121,094,351	2.23	2.29	2,081,114	2,769,855	..... Copperweld Steel Co.
5,932	45,804,182	95,340,258	2.32	11.88	1,064,697	11,329,508	..... Lone Star Steel Co.
9,660	63,159,247	62,226,543	5.86	6.17	3,704,251	3,838,646	..... Laclede Steel Co.
9,831	84,226,986	95,087,256	4.07	4.28	3,425,434	4,066,749	.... Universal-Cyclops Steel Corp.[17]
None	61,198,258	59,739,437	11.01	10.88	6,736,519	6,498,163	..... Keystone Steel & Wire Co.
3,250	46,798,182	42,657,749	8.31	6.46	3,887,634	2,756,655	..... Continental Steel Corp.
None	22,083,434	28,115,864	1.60	1.24	353,235	348,182	..... Atlantic Steel Co.
None	49,880,625	68,605,586	1.54	9.97	769,723	6,838,882	..... Carpenter Steel Co.[30]
8,850	49,520,680	47,642,446	5.12	3.85	2,535,776	1,831,952	..... Eastern Stainless Steel Corp.
None	19,764,547	26,581,025	6.05	10.19	1,195,742	2,707,995	..... Vanadium-Alloys Steel Co.[32]
2,952	17,463,613	24,326,370	3.69	4.37	643,910	1,061,979	..... Jessop Steel Co.
6,683	$12,091,978,374	$15,334,675,700	6.36	7.29	$769,375,705	$1,117,161,685	..... Totals (or averages)

Current Liabilities 1958	Current Liabilities 1957	Ratio of Current Assets to Current Liabilities 1958	Ratio of Current Assets to Current Liabilities 1957	Working Capital 1958	Working Capital 1957	
$726,824,930	$753,441,414	1.96—1	1.90—1	$696,296,429	$679,614,493	..... United States Steel Corp.
332,340,697	437,398,414	3.11—1	2.55—1	700,321,744	676,689,252	..... Bethlehem Steel Corp.
121,924,676	130,977,780	3.02—1	2.62—1	245,895,793	212,213,811	..... Republic Steel Corp.
108,371,000	118,061,000	2.41—1	2.21—1	153,120,000	142,969,000	..... Jones & Laughlin Steel Corp.
85,128,049	84,436,664	2.61—1	2.40—1	137,287,541	118,154,844	..... National Steel Corp.
83,203,738	91,174,616	3.74—1	3.20—1	227,619,115	200,886,825	..... Youngstown Sheet & Tube Co.
126,909,538	126,182,870	3.69—1	3.37—1	340,971,865	298,924,416	..... Armco Steel Corp.[7]
73,755,991	72,913,069	2.98—1	3.56—1	145,933,487	186,785,479	..... Inland Steel Co.
44,833,237	57,595,288	2.54—1	2.21—1	69,041,476	69,733,224	..... Colorado Fuel & Iron Corp.
31,864,342	35,340,626	3.70—1	3.45—1	85,890,156	86,725,179	..... Wheeling Steel Corp.
15,000,762	14,441,237	3.49—1	3.63—1	37,300,295	38,051,019	..... Sharon Steel Corp.
31,457,398	22,889,440	2.40—1	2.61—1	43,924,343	36,918,415	..... McLouth Steel Corp.
51,879,773	55,373,300	1.73—1	2.11—1	37,985,905	61,394,801	..... Kaiser Steel Corp.
8,153,189	8,201,995	4.36—1	3.97—1	27,402,213	24,355,960	..... Detroit Steel Corp.
25,308,824	21,873,958	3.39—1	3.42—1	60,453,152	52,862,076	..... Crucible Steel Co. of America
26,591,765	20,053,326	2.16—1	2.60—1	30,868,954	32,070,254	..... Pittsburgh Steel Co.
20,643,760	17,702,157	2.62—1	2.84—1	33,448,593	32,577,303	..... Granite City Steel Co.
23,534,674	28,488,847	3.66—1	3.12—1	62,706,425	60,278,200	..... Allegheny Ludlum Steel Corp.
4,714,343	7,275,454	4.93—1	3.93—1	18,536,852	21,327,740	..... Barium Steel Corp.[33]
10,533,363	9,626,174	1.98—1	1.75—1	10,335,021	7,160,489	.. Northwestern Steel & Wire Co.[22]
12,303,063	8,137,886	1.58—1	1.82—1	7,082,772	6,677,753	..... Alan Wood Steel Co.
11,357,868	11,862,738	2.72—1	2.81—1	19,503,669	21,443,297	..... Lukens Steel Co.
17,527,438	12,916,128	2.23—1	2.66—1	21,644,387	21,413,518	..... Copperweld Steel Co.
9,773,378	10,815,211	5.02—1	4.34—1	39,258,423	36,131,639	..... Lone Star Steel Co.
6,277,198	5,370,038	3.66—1	3.81—1	16,676,214	15,103,052	..... Laclede Steel Co.
11,070,813	11,137,973	2.95—1	2.93—1	21,537,880	21,486,758	.... Universal-Cyclops Steel Corp.[17]
15,587,215	15,324,241	1.18—1	1.31—1	2,875,381	4,752,201	..... Keystone Steel & Wire Co.
3,862,975	3,100,816	4.53—1	4.80—1	13,638,973	11,787,097	..... Continental Steel Corp.
2,822,585	4,367,070	2.68—1	1.95—1	4,735,409	4,133,619	..... Atlantic Steel Co.
7,346,325	11,350,217	3.16—1	2.71—1	15,850,822	19,427,153	..... Carpenter Steel Co.[30]
7,586,780	5,713,970	3.34—1	3.64—1	17,728,477	15,084,931	..... Eastern Stainless Steel Corp.
2,316,647	5,342,809	5.47—1	2.65—1	10,346,799	8,840,699	..... Vanadium-Alloys Steel Co.[32]
2,187,887	2,145,618	3.91—1	4.00—1	6,375,113	6,447,257	..... Jessop Steel Co.
$2,062,994,221	$2,221,032,334	2.63—1	2.46—1	$3,362,593,678	$3,232,421,754	..... Totals (or averages)

[26] Adjusted for 10 per cent stock dividend.
[27] Stock dividend of 10 per cent.
[28] Includes set-asides for future income taxes.
[29] Plus 3 per cent stock dividend.
[30] Fiscal year ended June 30. Figures for 1958 include Carpenter Steel of New England Inc., subsidiary acquired Oct. 15, 1957, and operated only in a limited way through June 30, 1958.
[31] Based on capacity of 146,102 net tons.
[32] Fiscal year ended June 30.
[33] Includes two classes of preferred stock. In 1957, one class was outstanding only part of the year.
[34] Stock dividend of 5 per cent in 1958 and 6 per cent in 1957.

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Each of the over 5,000 different Stanscrew fasteners is always kept in stock at three conveniently located plants. This enables your Stanscrew distributor to provide faster service . . . to be particularly helpful in emergency situations where prompt delivery can mean substantial savings.

So, whatever your fastener requirements, just call your nearby Stanscrew distributor. Or for complete information on Stanscrew's new carriage and machine bolts, simply mail the coupon below.

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WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

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Name_____ Title_____

Company_____

Address_____

City_____ State_____

Forming no-sag springs. Pittsburgh Steel's 8 gage no-sag wire is bent into a regular no-sag spring for theater seat. Speed of operation and severe bending call for just the right combination of tensile strength and ductility.

No-Sag Spring Pioneer Uses Pittsburgh Steel Co. Wire Because Of 'Good Quality, Service, Delivery'

The company which introduced the no-sag spring in the United States 25 years ago today uses Pittsburgh Steel Co.'s No-Sag Wire because of "good quality, service and delivery."

Since 1934, No-Sag Spring Co. of Detroit has grown to a 22-plant operation, spreading from New Jersey to California and extending to a dozen foreign countries.

No-sag springs and the special no-sag wire from which they are formed were unheard of when the late Henry Hopkes Sr., founder of the firm, obtained patent rights from the German inventor and went into business in Detroit.

Now widely used in the furniture and automobile industries, no-sag springs made necessary the development of a special hard drawn, lead patented, high tensile wire made from selected steel heats. These specifications are met handily by the skilled steelmakers and wire drawers at Pittsburgh Steel Co.

No-sag wire has to be tailor-made because of the high-speed operation it undergoes on forming machines, many of which were designed by No-Sag Spring Co. engineers. Extra toughness is required to allow twisting short lengths to make ribbon lengths. Special restriction of cast is necessary for proper control in forming the springs.

Pittsburgh Steel consistently fur-

nishes coils of no-sag wire with tensile strengths up to 240,000 psi for wire .192 in diameter. At the same time, the wire is ductile enough to be wrapped on its own diameter as a mandrel without cracking or breaking.

G. L. Stine, who heads up research and development for No-Sag Spring Co., said:

"We have found Pittsburgh Steel wire to be of excellent quality and their service and delivery have been equally good. Pittsburgh Steel has certainly helped maintain and improve our reputation for quality springs in the industry."

• **Close Tolerances**—No-Sag Spring Co. also insists that the diameter be uniform and that the wire be free of surface defects, pipe or kinks.

The company forms wire into three general types of no-sag springs. Precise engineering at No-Sag Spring determines the best type of spring for any application.

Regular no-sag springs have the original size and shape loop that was first developed with a loop approximately 1⅞ inches wide and a ⅞-inch space between the parallel wires. XL-No-Sag springs have an extended loop with a loop size of 1⅞ inches and 1⅛-inch space between parallel wires. Supr-Loop strands have a loop size of three inches wide and 1¾ inches between parallel wires.

Whether you're making no-sag springs or using one of the other grades of wire—from rope wire to cold heading wire, you'll benefit from the steelmaking and wire-drawing skill which has gone into the development of such special wires as no-sag spring wire.

You'll like the same kind of service and deliveries which Pittsburgh Steel Co. gives the No-Sag Spring Co. Bring your wire needs or coiling problems to the trained people at Pittsburgh Steel Co. today. Help is as close as your telephone. Just call the sales office nearest you. See list below.

Experimental Department constantly seeks new applications. This new type of day bed shows two types of no-sag springs—regular loops in top half and Supr-Loops in bottom.

"Soft End" for easy chair seat is made so that end of spring remains free. Installed in chair, ends will be connected along edge of seat. Resiliency of wire can be depended upon to retain shape of spring. Freedom from defects in the surface of the wire provides uninterrupted production on No-Sag Spring's machines . . . cuts down rejects and losses from scrap.

Back springs for sofa have ends turned back on themselves to form V-Arcs.

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WILL YOU HELP?

TO LEARN what type depreciation reform is favored, STEEL surveyed 918 top metalworking executives (Mar. 2, p. 69). Some 40.1 per cent want the bracket system; 37.7 per cent want faster writeoffs, using the present useful life concept; 12.7 per cent want reinvestment depreciation; 1.8 per cent want higher first year credit. (At present, you can write off 20 per cent in the first year of acquisition if the property's cost doesn't exceed $10,000.)

We need majority support for some kind of reform before Congress will act. To help you evaluate some of the approaches favored, we explained the bracket system two weeks ago. Last week, we examined the faster writeoffs advocated by Machinery & Allied Products Institute. This week we describe reinvestment depreciation. We'll look at the proposal to allow higher first year writeoffs two weeks from now (STEEL, Apr. 13).

You will get depreciation reform eventually—if you keep pushing for action.

WILL YOU HELP?

Depreciation Reform: Reinvestment?

A THIRD METHOD of depreciation reform was developed by Maurice E. Peloubet, accountant.

The value of depreciable business property in the U. S. would be at least $100 billion higher if figured on replacement costs instead of traditionally on original costs.

• **Inflation** — That's one way to show the effects of inflation. U. S. depreciation policies, based on the concept of original costs, have forced us to overstate our profits and pay tax and dividends on those paper profits. Those false profits are mounting at the rate of about $6 billion a year. What can be done?

Mr. Peloubet advocates a remedy he calls reinvestment depreciation: When a property is retired, you can deduct the difference between its value in current dollars and its cost at the time it was acquired. That amount, added to what was already written off, will compensate for the decline in the value of the dollar. The deduction would be allowed only to the extent that an equivalent investment is made within two years of retirement. The amount written off in the first year would be deducted from the depreciable basis of the new property.

• **Flexible**—Reinvestment depreciation would work under the present Bulletin F setup or under a bracket system. Needed: Close cost accounting and an index—such as a new one developed by the government or Commerce Department's construction index.

• **How It Works**—Suppose that in 1959 a taxpayer dismantles a machine purchased in 1939 for $50,000 and fully depreciated since then. Assume that the cost index shows an increase in price levels of 130

MAURICE E. PELOUBET developed reinvestment depreciation. He's a partner in the New York accounting firm of Pogson, Peloubet & Co.

per cent from 1939 to 1959. The taxpayer may elect to deduct in 1959 the cost of the property purchased that year to the extent that its cost exceeds $50,000 but not more than $115,000 (230% x $50,000). The maximum deduction is $65,000, or the equivalent of the 130 per cent cost increase. The remaining $50,000 can be depreciated at normal rates.

Another example: Suppose that in the previous case new investment is only $60,000 in 1959 but that additional investment amounting to $200,000 is made in 1960. The taxpayer would take reinvestment depreciation deductions of $10,000 in 1959 and $55,000 in 1960—the total of $65,000 in deductions for the two years equaling the 130 per cent index increase multiplied by the $50,000 original cost.

• **Precedent** — Reinvestment depreciation applies the principles of LIFO (last in, first out). The government has accepted that in inventory accounting and in the sale of private homes. If you sell your house, the "profit" resulting from inflation since you bought it is not taxable if you acquire another house within a specified time.

• **Keogh Bill**—A measure now before Congress (H.R. 131) would enact reinvestment depreciation. It was introduced by Rep. E. J. Keogh (D., N. Y.).

• **Pros and Cons**—This approach to reform has the major advantage of stopping the erosion of capital from inflation. It would stimulate equipment investment.

The main argument against it is that it's complicated and would require an index. Mr. Peloubet's rebuttal: We already use indexes in the LIFO inventory accounting.

Advocates of the method include some steel and cement producers, the American Cotton Manufacturers Institute, American Paper & Pulp Association, Association of American Railroads, several copper and brass mill companies, some members of the electrical manufacturing industry, Lithographers National Association Inc., the coal industry, and some public utilities.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

This Tax Reform Pays for Itself

That's the claim of Mr. Peloubet for his reinvestment depreciation. Here's his argument:

Total depreciation taken for federal income tax purposes has been averaging about $15 billion a year. If we were to go on a replacement cost basis, that would perhaps mean an additional $6 billion a year. On the face of it, you taxpayers would pay $3120 million less taxes (at a 52 per cent rate).

Yet this tax reform pays for itself if you agree that two assumptions are reasonable:

1. That for every $1000 spent for plant and equipment, you create new business, new wages—and federal taxes on the new corporate and personal income. Mr. Peloubet calculates that the U. S. gets $260 in taxes for each $1000 spent.

2. That additional funds placed in your hands on the condition that they are spent for plant and equipment will be spent in addition to any other amounts now planned. Under the law proposed for reinvestment depreciation, you get credit only if you retire property and if you spend on new assets an amount equivalent in current dollars to the historical costs of the property retired.

If those assumptions are reasonable, you could get an allowance of $1000 for each additional $1000 spent for plant and equipment without costing the U. S. anything in lost revenues the first year. That's because a $1000 deduction would, at a 52 per cent tax rate, reduce the tax by $520. But an equivalent $520 would go to the U. S. in taxes by spending $2000, the current value of the property retired.

These figures show the arithmetic of first year results to taxes under reinvestment:

		Additional Depreciation 52%	Tax Generated at $26 per $100
Historical cost	$1,000		
Current value	1,500		
Spent for new property	1,500		$390
Reinvestment depreciation allowed	500	$260	
Net gain to the revenue		$130	
Historical cost	$1,000		
Current value	2,000		
Spent for new property	2,000		$520
Reinvestment depreciation allowed	1,000	$520	
No gain or loss to the revenue			

If there's no revenue loss in the first year from the application of reinvestment depreciation, the tax revenue would be increased in subsequent years. Here's why: In the $2000 deal (the second example, above), $1000 is written off in the first year with no gain or loss to the revenue. That leaves just $1000 to be written off from the second year through the end of the asset's life. Income is reduced by $1000 over the remaining life, with a tax reduction of $520.

Under present depreciation rules, a $2000 asset with a 20 year life would have $1900 still to be written off beginning with the second year. Income would be reduced by $1900 over the remaining life, with a tax reduction of $988.

But the Treasury would gain even more than that. The dollar spent for capital purposes bounces farther than any other—boosting business volume and wages and the federal taxes on such income.

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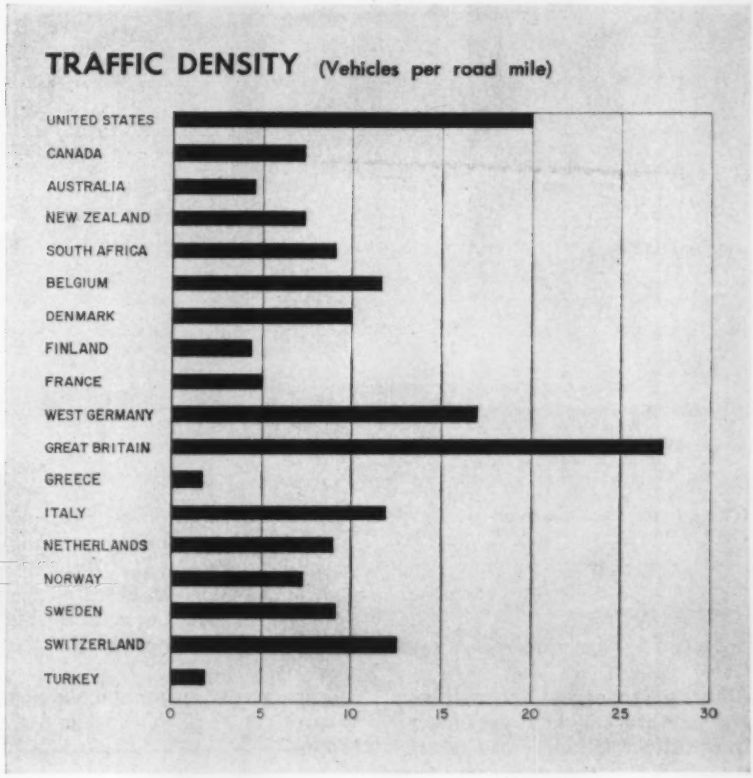
European Trucks for Use — Not Looks

Diesel engines, trucks of 6000 lb (gross volume weight) and under, leaf springs, and smaller tire diameters are popular in Europe. British designer criticizes American "massive look"



Source: John Alden, Vauxhall Motors Ltd. Based on 1956 reports.

NOW THAT domestic passenger car builders have taken a cue from foreign designers, truck manufacturers and operators may also pick up some pointers.

U. S. producers should consider emulating the European reduction of hood and fender height so drivers can see what's ahead, says John Alden, commercial vehicle engineer for GM's British subsidiary, Vauxhall Motors Ltd. "The American tendency to raise the hood line to produce a massive and powerful looking front end is considered wrong in Europe. The primary styling objectives for commercial vehicles should be function and safety," he asserts. That's one reason why closed van type trucks with 100 cu in. engines are popular abroad.

Economical railroad transportation eliminates the need for long distance, heavy duty trucks in most European countries. And roads aren't well suited for heavy hauling. Operators prefer rigid six or eight wheel trucks that don't require specially trained drivers. Designers have specialized in light trucks of 6000 lb (gross volume weight) and under. But there's little demand for the light pickup trucks so popular here.

• **Engines** — Four cylinder, direct injection diesel engines are most commonly used for heavier trucks. Diesels of 100 cu in. are gaining widespread acceptance in lighter trucks. Mr. Alden points out that direct injection is economical, so that even with diesel fuel competitive with gasoline (60 cents vs. 59.8 cents per gallon in England) the additional cost of the engine can be saved after 15,200 miles. "European truck operators like the diesel's flatter and wider torque curve, better lugging characteristics, and longer life," he adds.

Diesels offer better than 50 per cent savings over gasoline powerplants, even when running at the usual city speeds of 8 to 10 mph. They also help lessen the fume problem. Mr. Alden says that with diesel use growing, builders are in-

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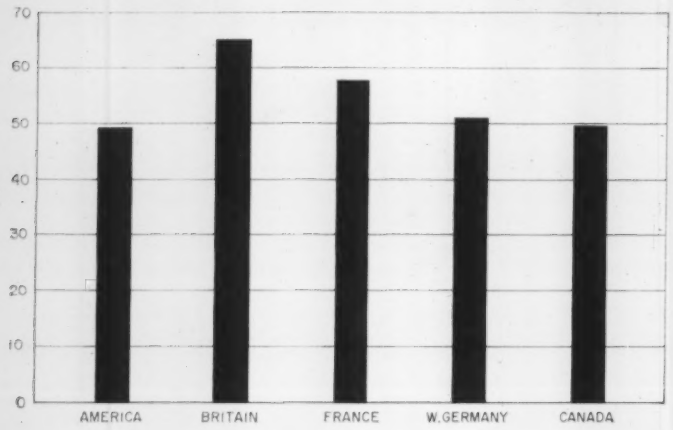
Percentage of Trucks under 6000 Lb



Source: John Alden, Vauxhall Motors Ltd. Based on 1957 world truck production. Ratios valid for 1958.

terested in the German designed Deutz air cooled diesel. It appears to be even cheaper to make and more economical to operate.

• **Frames** — European chassis and frame designs are similar to the American approach, although several light truck builders use unitized construction. Flitch plates of the American "L" pattern are used, but the most common way to reinforce frames is riveting or welding extra strips to the bottom and top frame flanges. There is a growing tendency to increase frame sections over the axles because roads are bumpy and trucks are often overloaded.

At least nine manufacturers are using welded frame construction for heavier trucks, but most builders are still using rivets. The use of fitted bolts is rapidly vanishing.

• **Suspension** — Leaf springs for 6000 lb (gvw) and up are virtually universal in Europe. Coil springs and torsion bars are most common for light trucks. Independent springing is reserved primarily for buses. Manufacturers are attempting to introduce lower spring rates to improve the loaded and unloaded ride. Shock absorbers are usually standard equipment on front axles and optional on the rear. Air suspension is in limited use only on heavy duty rigs due to its high cost. Mr. Alden believes further development will boost acceptance because it offers constant ride frequencies.

Some recent suspension developments include an unusual leaf spring mounting system for German Lloyd trucks. The setup uses bonded rubber bumpers between the spring and frame. Rubber pads are inserted between spring leaves.

Another device is the Scammell rocking front axle suspended from a centrally pivoted beam to eliminate frame distortion. Road shocks are absorbed by coil springs and built in dampers. The axle is located sideways by a Panhard Rod. The fore and aft location is by torque arms, ball mounted to the chassis.

• **Wheels and Tires** — "Probably the most interesting trend is the move toward smaller tire diameters. The ability of a given over-all diameter tire to carry more load (so over-all height, cab step-up height, and body loading height can be reduced) is now an important objective," declares Mr. Alden. Most popular tire size is 16 in. For ½ and ¾ ton, four wheel trucks; 13 in. tires that can carry up to 5000 lb (gvw) are available.

The smaller tires reduce turning circles, a vital factor in congested European cities. They also provide a built-in gear reduction which permits the load on axle gears and axleshaft torque to be reduced by 15 per cent. Savings in tread life of up to 30 per cent have been made by using 16 in. instead of 20 in. tires, adds Mr. Alden. There's growing use of steel cord tires which cut wear 60 per cent or more.

Truck wheels are fabricated from steel stampings, forgings, or cast wheel discs. The most recent development in this field is the use of square blank mounting faces welded to the rims.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,112
2 Mo. Totals	1,024,241	881,627
March		357,049
April		316,503
May		349,474
June		337,355
July		321,053
August		180,324
September		130,426
October		261,696
November		514,099
December		593,920
Total		4,243,526

Week Ended	1959	1958
Feb. 21	120,780	89,977
Feb. 28	127,783	91,508
Mar. 7	133,540	83,892
Mar. 14	134,283	86,447
Mar. 21	136,269†	80,560
Mar. 28	134,000*	93,844

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

• Chevrolet Div. is offering a chrome restorer called Brush-Glo. The compound works on diecast metals, aluminum brass, copper, and other trim alloys. It's applied as a paste and washed off when dry. You can get it only through Chrevrolet dealers.

• General Motors of Canada Ltd. forecasts 1959 Canadian sales of 400,000 cars and 75,000 trucks, 9 per cent over 1958's and 4 per cent ahead 1957's. The prediction includes import sales, says E. H, Walker, company president.

CASE HISTORIES

Exclusive Sentri-Seals effectively seal out foreign materials at temps up to 225°F for extended periods—up to 350°F for shorter periods. Made of Buna-N, they are compatible with silicone, petroleum and diester lubricants.

Photo courtesy: Thor Power Tool Company

Bearings Seal Out Abrasives...Allow Cool Operation In 21,600 R.P.M. Grinder!

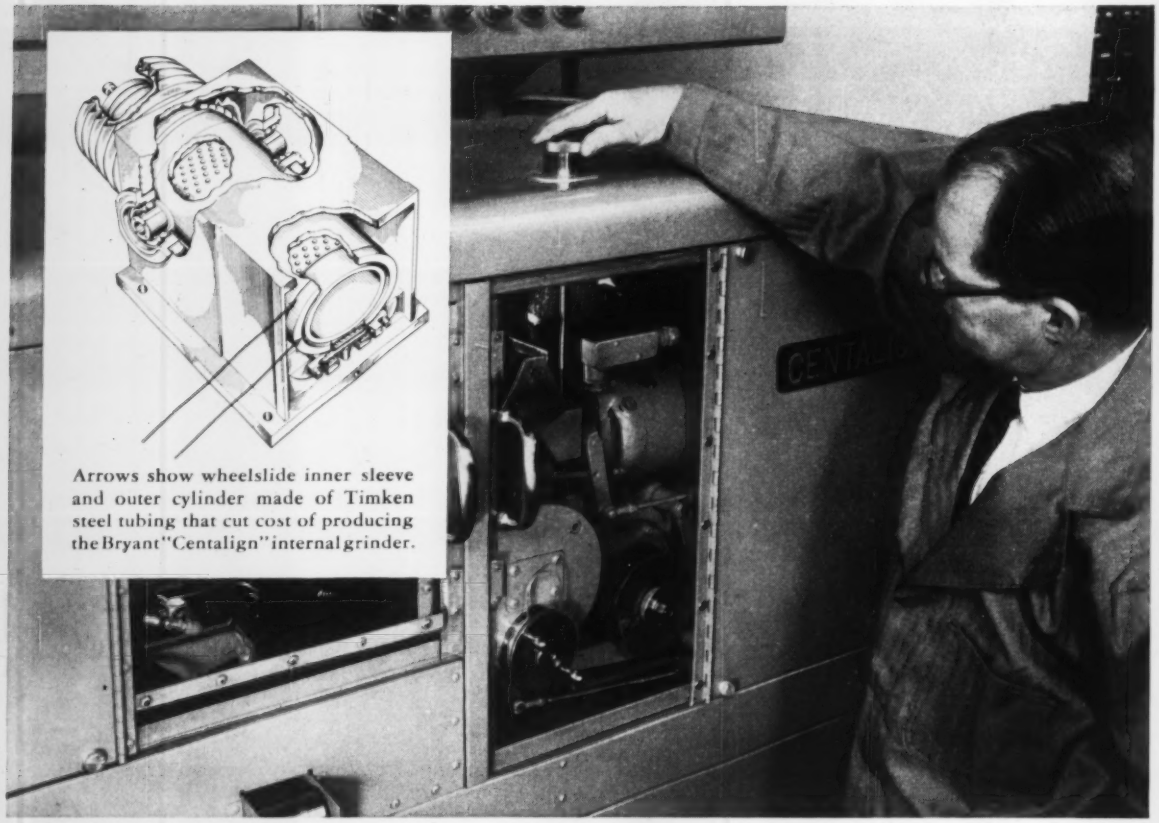
CUSTOMER PROBLEM:
Tool manufacturer requires bearing design that will seal 21,600 r.p.m. grinder from abrasives . . . yet heat must be minimized for operator comfort since tool is hand held.

SOLUTION:
N/D Sales Engineer recommended a group of four New Departure integrally enclosed bearings . . . some with Sentri-Seals. These precision ball bearings successfully shut out microscopic grinding abrasives. And, even with such positive sealing, the virtually friction-free New Departures help keep the temperature low enough for comfortable hand operation. They're sealed and lubricated for life . . . promising trouble-free ball bearing performance without the added burden of periodic maintenance.

For immediate analysis of your current ball bearing problems, call the New Departure Sales Engineer in your area or write Dept. T-3.

Replacement ball bearings available through United Motors System and its Independent Bearing Distributors

NEW DEPARTURE
DIVISION OF GENERAL MOTORS, BRISTOL, CONN.
NOTHING ROLLS LIKE A BALL



Arrows show wheelslide inner sleeve and outer cylinder made of Timken steel tubing that cut cost of producing the Bryant "Centalign" internal grinder.

BRYANT CHUCKING GRINDER CO.

Saves 45% with switch to TIMKEN® steel tubing

ENGINEERS at Bryant Chucking Grinder Co. wanted to reduce the cost of producing this "Centalign" internal grinder. They blamed high costs on spoilage due to weld checking and excessive machining time of the inner sleeve and outer cylinder of the wheelslide. When they consulted Timken Company metallurgists, these experts studied all angles of the problem. And they recommended a change to a certain grade and size of Timken® seamless steel tubing. Here's what happened.

Because the tubing was perfectly suited to welding, checking was ended. And costly machining time was cut because excessive stock removal was eliminated. The tubing was the right size for the job. They cut production costs 45%! What's more, the tubing had the desired hardness and grinding properties, responded uniformly to heat treatment.

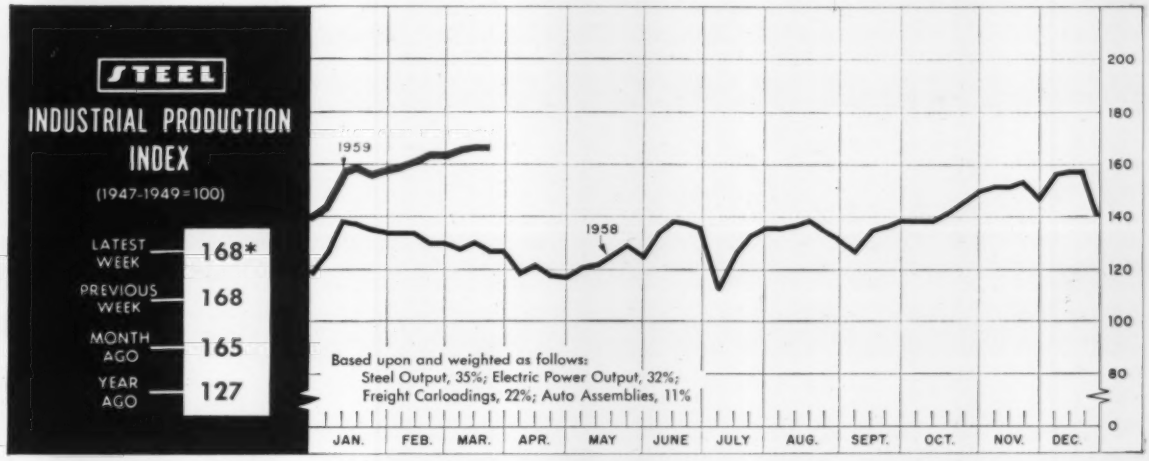
Timken seamless steel tubing gives better quality finished products because of the way we make it. We forge a solid round over a mandrel, thoroughly working the metal inside and out. This rotary piercing operation gives the tubing its fine forged quality and uniform spiral grain flow for extra strength. Careful control keeps this quality uniform from tube to tube, heat to heat, bar to bar.

To help cut costs on your hollow parts jobs, let our engineers recommend the tube size most economical for you. It's guaranteed to clean up to your finished dimensions. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Makers of tapered roller bearings, fine alloy steels and removable rock bits.

Timken alloy steel and seamless tubing is available from warehouse stock in 44 cities in the United States. Call your local Timken Company sales office for the name of your nearest Timken steel distributor.

TIMKEN® *Fine Alloy* STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Mar. 21.

Production Index Equals Record High

STEEL's industrial production index has bounced all the way back. The preliminary figure for the week ended Mar. 21 and the final reading for the preceding week both equaled the all-time high set in the first three weeks of December, 1956. Early indications are that the '56 record will fall when final figures for the latest week are all in.

For the first time in several weeks, output of steel played a relatively minor role in the steady upward advance of the trend line above. Steady improvement of electricity output, automobile assemblies, and freight carloadings put the index in the "record" class. Steel production remains strong, but improvement will come slowly because the industry is brushing against its optimum operating rate.

• **Constant Power** — The nation's electric utilities are turning out more power than they ever have at this season. Distribution figures compiled by Edison Electric Institute have shown marked stability at close to 13 billion kw-hr for the last three weeks. A downtrend at this time of the year is not unusual. Several factors are credited for this industry's performance: 1. Steady growth in number of customers and per capita consumption of electricity. 2. Unusually cold weather which requires more power for heating. 3. Increasing use by industry as production schedules are stepped up to match rising new orders.

• **Red Ball Signal**—Steady improvement in the rail shipment of goods is maintaining freight carloadings at the best level of 1959. They have held above 590,000 cars for the last three weeks, says the Association of American Railroads. The margin over year-ago loadings is better than 10 per cent. That will widen in coming weeks as the result of the decline last year and steady improvement this year.

Miscellaneous freight carloadings, which include the bulk of metal-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,627[1]	2,631	1,366
Electric Power Distributed (million kw-hr)	12,900[1]	12,996	11,756
Bituminous Coal Output (1,000 tons)	7,620[1]	7,715	7,792
Crude Oil Production (daily avg—1,000 bbl)	7,150[1]	7,127	6,263
Construction Volume (*ENR*—millions)	$393.7	$372.1	$278.3
Auto, Truck Output, U. S., Canada (*Ward's*)	171,608[1]	168,020	104,928
TRADE			
Freight Carloadings (1,000 Cars)	590[1]	595	533
Business Failures (Dun & Bradstreet)	311	288	336
Currency in Circulation (millions)[3]	$31,287	$31,215	$30,592
Dept. Store Sales (changes from year ago)[3]	+9%	+5%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,589	$22,945	$25,951
Federal Gross Debt (billions)	$284.5	$285.0	$275.4
Bond Volume, NYSE (millions)	$36.6	$37.9	$20.7
Stocks Sales, NYSE (thousands of shares)	21,613	21,187	11,316
Loans and Investments (billions)[4]	$94.2	$93.8	$89.4
U. S. Govt. Obligations Held (billions)[4]	$30.6	$30.6	$28.0
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	220.9	220.9	201.4
All Commodities[7]	119.4	119.3	119.6
Commodities Other than Farm & Foods[7]	127.8	127.7	125.9

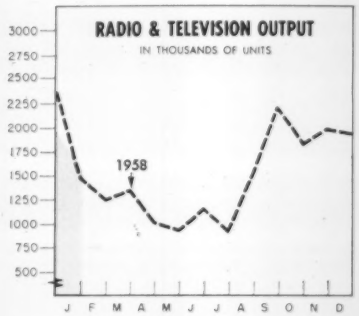
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WELDMENTS
Arc Welding
DIVISION OF THE UNITED TOOL & DIE CO., WEST HARTFORD 10, CONN.
Machine bases, components, environmental and test equipment, pressure vessels . . . welded fabrications of every kind. Extensive cutting, forming, welding, X-ray and gamma ray equipment. Qualified welders. All recognized codes. Send your drawings and specifications to us for prompt detailed quotations.

THE BUSINESS TREND

	1959	1958	1957	1956
Jan.	115.84	93.07	126.34	122.43
Feb.	....	93.49	139.29	129.56
Mar.	....	97.89	140.76	166.14
Apr.	....	122.36	132.67	145.20
May	....	118.04	157.95	155.53
June	....	131.15	121.57	189.13
July	....	134.34	128.31	165.50
Aug.	....	104.46	110.09	168.70
Sept.	....	85.41	116.79	130.35
Oct.	....	111.35	124.80	143.38
Nov.	....	110.88	87.80	138.50
Dec.	....	105.97	105.65	117.76
Avg	....	109.87	124.34	147.68

Material Handling Institute Inc.
Charts copyright, 1959, STEEL.



	Radio		Television	
	1959	1958	1959	1958
Jan.	1,125	1,026	437	434
Feb.	....	877	...	370
Mar.	....	931	...	417
Apr.	....	697	...	303
May	....	655	...	267
June	....	774	...	377
July	....	622	...	275
Aug.	....	1,029	...	507
Sept.	....	1,572	...	622
Oct.	....	1,322	...	496
Nov.	....	1,546	...	438
Dec.	....	1,526	...	415
Totals	....	12,577	...	4,921

Electronic Industries Association.

working's rail shipments, are running between 40,000 and 50,000 cars above the corresponding figures of last year, indicating to some extent the improvement in manufacturing. Both ore and coke shipments are well above the year-ago rates in response to greater demand from steelmakers.

• **Autos Rolling**—If there is any serious weakness ahead in the structure of the production index, it will be due to the auto industry. But so far no such weakness has appeared. Output of trucks and cars for the week ended Mar. 21 rose to 161,888 units, the best scheduling of the year, reports *Ward's Automotive Reports*.

Several producers are beginning to soften their schedules a bit, with the first effects to show up in the week ended Mar. 28. However, early March sales (133,300 units) hit the best level for the initial ten-day period since the beginning of the year, and if this trend continues, producers may stick to the current pace.

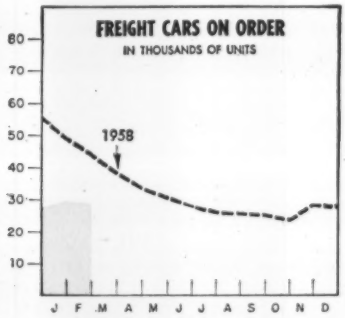
New car stocks should be near the 850,000 unit mark by the end of this month. This would be slightly under the level at that time last year. But in view of the 20 to 25 per cent gain in sales so far in 1959, it appears that there is room for a few more cars in inventory before the industry becomes excited about stocks.

• **Steel, the Record Breaker** — It looks like steel output is going to play a more positive role in setting an industrial production index record than it did in equaling the old one. Every time this industry puts out one more ton of steel in a week, it breaks a production record. It has set and broken three of those marks in three weeks, and last week was no exception. The American Iron & Steel Institute says producers turned out 2,631,000 net tons of steel for ingots and castings during the period ended Mar. 22, while operating at 92.8 per cent of capacity. STEEL estimates the rate for the week ended Mar. 29 at 93 per cent.

If the other three elements of our industrial production index come up to expectations, this extra steel output will push the trend line into new high territory.

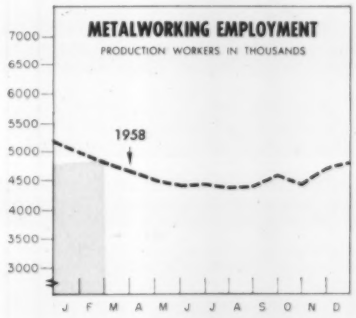
Recovery Pattern Spreads

Some observers question that the economy as a whole has made it back to prerecession levels despite



	Awards		Backlogs (end of month)	
	1959	1958	1959	1958
Jan. ..	4,007	401	29,470	48,787
Feb. ..	1,806	287	28,789	43,750
Mar. ..	....	193	.....	38,027
Apr. ..	....	278	.....	32,908
May ..	....	1,370	.....	30 386
June ..	....	317	.....	27,757
July ..	....	376	.....	25,994
Aug. ..	....	1,773	.....	25,611
Sept. .	....	1,580	.....	24,982
Oct. ..	....	781	.....	23,670
Nov. ..	....	6,295	.....	27,962
Dec. ..	....	3,830	.....	27,596
Total ..	....	17,481		

American Railway Car Institute.



1958	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Feb.	913	806	1,109	767	1,207
Mar.	885	787	1,090	749	1,153
Apr.	849	766	1,061	729	1,103
May	840	756	1,029	715	1,081
June	859	773	1,014	716	1,084
July	852	765	990	712	1,063
Aug.	864	788	977	734	1,034
Sept.	898	822	1,007	762	1,100
Oct.	899	791	1,005	746	992
Nov.	930	827	1,020	788	1,199
Dec.	943	824	1,038	789	1,208
1959					
Jan.	954	819	1,053	791	1,214
Feb.	982	825	1,071	791	1,197

*Preliminary.
U. S. Bureau of Labor Statistics.

the appearance of STEEL's (or any other) production index. But evidence is mounting weekly to show the recovery is being felt even in those businesses hardest hit by the recession.

• **Machine Tools**—Net new orders in February for cutting type machine tools advanced to $36,050,000, the highest value since August, 1957, reports the National Machine Tool Builders' Association. Shipments, though showing a mild improvement, fell below orders for the first time since September, 1956, which resulted in a rise in the industry's backlog to 3.8 months. Orders for forming type tools declined, but the total new order position for both types of tools still showed an edge of $3.45 million over January's total. Even builders of heavy, long leadtime tools report an increase in new orders.

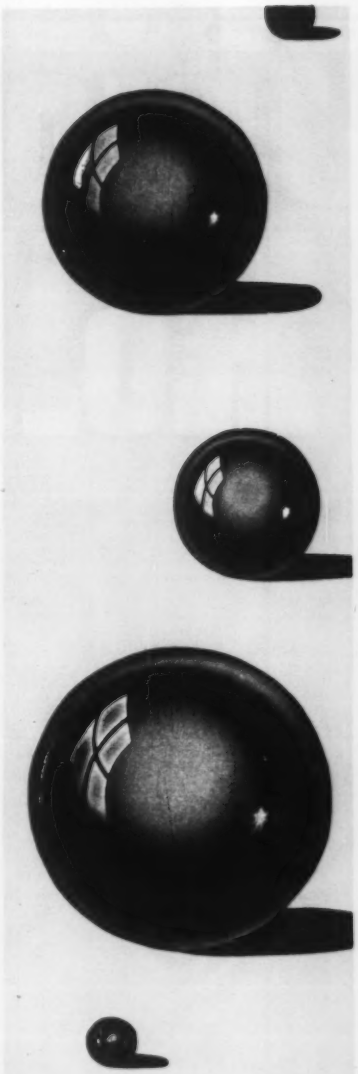
• **Resistance Welders** — For the third consecutive month, makers of resistance welding equipment boosted their incoming business. Net orders for February totaled $2,457,418, says the Resistance Welder Manufacturers Association. Shipments rose to $1,889,462 and the order backlog moved up to $7,639,018.

• **Material Handling**—Members of the Material Handling Institute reported a 10 per cent increase in shipments during January, raising the institute's index to 115.84 per cent of the 1954 base period. (See graph and table, Page 62.)

• **Freight Cars**—Although February was the slowest month since last October, orders for new freight cars for the first two months of 1959 are well above the 1958 monthly average. (See graph and table above.) Indications are increased order activity noted from November through January will be continued in March.

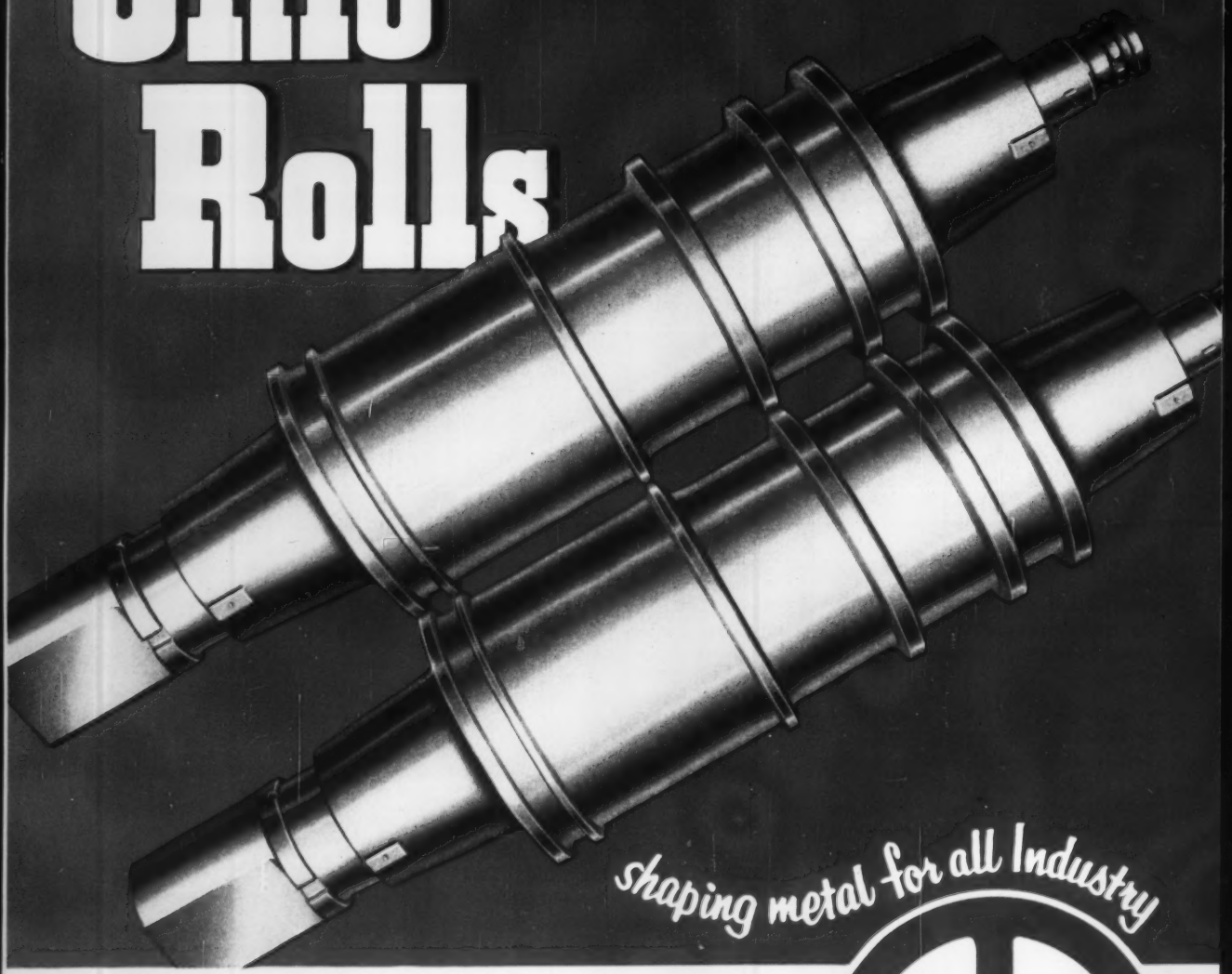
• **Heating Equipment**—New orders for industrial furnaces also slipped during February, declining 22 per cent from the January figure to $2,741,000, reports the Industrial Heating Equipment Association Inc. But orders for induction equipment rose 14 per cent above the January level.

• **Forgings**—Commercial steel forgings shipments gained slightly in January, rising from December's 112,530 tons to 112,926 tons. The backlog rose for the eighth consecutive month.



COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Ohio Rolls



shaping metal for all Industry

OHIO IRON AND STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

The Ohio Steel Foundry Co.

LIMA, OHIO

LIMA... Virtually at the center of the steel industry

PLANTS AT LIMA AND SPRINGFIELD, OHIO

OR50

RICHARD J. ULBRICH
Ulbrich Stainless v. p.

ERIC G. MESSLER
Sandvik Steel v. p.

JAMES A. TAYLOR
Standard Screw president

EDWIN H. BURKE
Morgan Eng. director

Richard J. Ulbrich was named vice president-production, **Ulbrich Stainless Steel**, Wallingford, Conn.

Eric G. Messler was elected vice president and assistant general manager, **Sandvik Steel Inc.**, Fair Lawn, N. J. He was manager of Coromant carbide sales and manager of steel sales, serving in that dual capacity since 1955. **David P. Cameron** was made sales manager for the Coromant line.

George H. Esch was made plant manager, **General Metal Products Co.**, St. Louis. He has served the company in a consulting capacity for a number of years.

Kenneth M. Chakiris was made sales manager for the Horton Chuck line of **Geometric-Horton Div.**, United Greenfield Corp. He is in New Haven, Conn.

Vaughn Machinery Co., Cuyahoga Falls, Ohio, appointed **C. B. Jones**, former head of Lewis Machine Co., to direct development and marketing of its new line of wire straightening and cutting machines.

E. C. Shawe was made production manager, **Dodge Assembly Plant**, Detroit, Chrysler Corp. He was quality control manager, and is succeeded by **B. L. Hengesbaugh**, former supervisor of quality engineering. **R. E. Castle** replaces Mr. Hengesbaugh. **A. M. Pachla** was named supervisor of traffic.

Richard L. Gutenkunst and **Thomas J. Gutenkunst** were elected vice presidents of **Milwaukee Malleable & Grey Iron Works**, Milwaukee.

James A. Taylor was elected president of the coast to coast operations of **Standard Screw Co.**, Bellwood, Ill. Former vice president, he succeeds **W. D. Corlett**, now chairman. As president of Hartford Machine Screw Co., Mr. Taylor continues to direct activities of this Standard division and plant in Hartford, Conn. Mr. Corlett will do the same for Chicago Screw Co., division in Bellwood.

H. Corbyn Rooks was made vice president-engineering, **Trane Co.**, La Crosse, Wis. He succeeds **Ray E. Lucey**, retired.

Peter C. Rossin was named general manager, Refractomet Div., **Universal-Cyclops Steel Corp.**, Bridgeville, Pa. He was technical director of the division. **William L. Bruckart** was made sales manager for Refractomet.

Dr. J. Earl Taylor was made manager of research and development, **Girdler Catalysts**, Louisville, a unit of Chemetron Corp.'s Chemical Products Div. He succeeds **Dr. John N. Pattison**, now in charge of a diversification and long range research program. Dr. Taylor was market development manager for Girdler, and incorporates that function in his new post.

Gordon Smith was named director of industry marketing for **Remington Rand Univac Div.**, Sperry Rand Corp., New York. He will be assisted by **A. F. Draper** as manager-industrial sales. Mr. Smith was with International Business Machines Corp.

Edwin H. Burke was appointed director of engineering, **Morgan Engineering Co.**, Alliance, Ohio. Former chief engineer, he succeeds **C. F. Simmers**, vice president-engineering, who resigned as chief engineering executive because of ill health.

James P. Spresser was made manager of planning, standards, and methods of the Everett, Mass., foundries of **General Electric Co.'s** Foundry Dept. His responsibilities include casting design.

A. W. Thomas Jr. was named president, **U. S. Textile Machine Co.**, Scranton, Pa., and continues as general manager. He succeeds the late **Herbert Gleitz.**

Peter V. Cerar was appointed director of sales, **Daco Instrument Co.**, Brooklyn, N. Y. He was manager of procurement for Engine Div., Fairchild Engine & Airplane Corp.

R. L. Hoffman was promoted to sales manager, **Bloom Engineering Co. Inc.**, Pittsburgh. He was manager of the Philadelphia sales office.

Robert G. Matters was named to head **Allis-Chalmers Mfg. Co.'s** new materials engineering section, Steam Turbine Dept., Milwaukee.

Stephen Kakish was named director of purchases of **Hynes Steel Products Co.**, Youngstown, and its affiliate, Roll Formed Products Co.

M. E. Miller was named president; **Jay Rigdon**, vice president-sales, **Metal Glass Products Co.**, Elkhart,

EDGAR D. KIBBLE

JAMES GILLESPIE

McLouth Steel promotions

HAROLD R. WARSMITH

JOHN R. SIMON

Jeffrey Mfg. promotions

Ind., a subsidiary of Barler Metal Products Inc.

McLouth Steel Corp. appointed **Edgar D. Kibble** manager of its Trenton and Gibraltar, Mich., plants. He is succeeded by **James Gillespie** as general superintendent of the Trenton plant's Rolling Mill & Maintenance Div. **Russell Goodfellow** was made superintendent of electrical and mechanical maintenance at the Trenton plant. **Edward E. Harris** was made director of industrial relations for both plants.

Clarence M. Elliott was made assistant electrical superintendent at **Republic Steel Corp.'s** South Chicago plant. He succeeds **Frank J. Zupancic**, recently named superintendent of the Electrical Dept. at the Warren, Ohio, steel plant.

Clayton L. Heintz, sales manager, Valve & Fitting Div., **Cooper Alloy Corp.**, Hillside, N. J., named **Gordon F. Ryan** as salesman for stainless steel valves and fittings in New Jersey.

M. J. O'Halloran was made assistant general sales manager, industrial product sales, for **Kaiser Aluminum & Chemical Sales Inc.**, Chicago. He succeeds **S. P. Whiteside**, named northeastern regional sales manager.

Machinery Hydraulics Div., Vickers Inc., named **Jacques Carpenter** district manager of the Detroit industrial sales office. He was district manager, Worcester, Mass.

Hardwick L. Browne was made sales manager-welding products, International Div., **Harnischfeger Corp.**, Milwaukee.

Harold R. Warsmith was named factory manager, **Jeffrey Mfg. Co.**, Columbus, Ohio. He was general superintendent, and is succeeded by **John R. Simon**, former superintendent-Machine Div.

George B. Vieweg Jr. was appointed special projects assistant, Purchasing Div., **Wheeling Steel Corp.**, Wheeling, W. Va.

B. R. Teree was appointed vice president-engineering, **Republic Mfg. Co.**, Cleveland. He was vice president-engineering and manufacturing, Greer Hydraulics Inc.

L. A. Fugassi, assistant chief engineer at **Weirton Steel Co.**, division of National Steel Corp., was appointed chief engineer at **Midwest Steel Corp.**, a new plant National Steel will build in the Chicago metropolitan area. He is succeeded at Weirton by **J. M. Bendot. J. W. Martt**, assistant chief draftsman, was named chief draftsman at Weirton to succeed Mr. Bendot. **William L. Barr** was promoted from designer to assistant chief draftsman.

Gibson Electric Co. named **Childress B. Gwyn Jr.** special projects engineer. At the company's home plant in Delmont, Pa., he is responsible for technical liaison with engineering, manufacturing, and sales.

Harry T. Dillon, project staff engineer at Pomona, Calif., for **Convair Div.**, General Dynamics Corp., was appointed manager of a new Convair field office at Huntsville, Ala. He has been in charge of operational support aspects of Convair's Tartar guided missile program for the U. S. Navy. **Tracy Brooks**, former executive development administrator for Convair-San Diego, was appointed college relations administrator, and will co-ordinate the recruitment program for Convair's five operating divisions.

John L. McLaughlin was made district manager of porcelain enamel frit sales and service in the south-

L. A. FUGASSI

J. M. BENDOT

J. W. MARTT

Midwest Steel and Weirton Steel appointments

ACHESON

dispersions digest

Reporting uses for

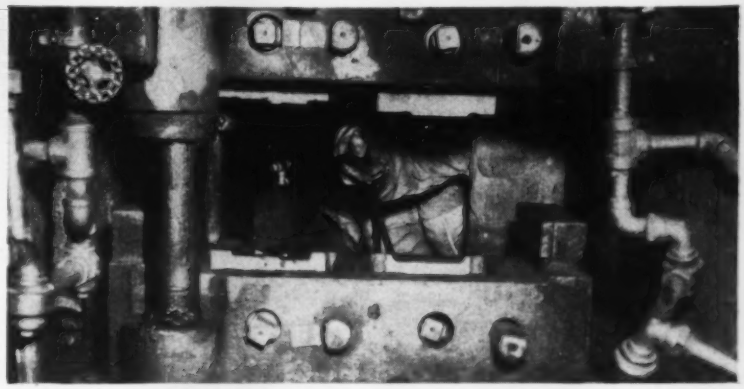
dag® BRAND DISPERSIONS

COLLOIDAL DISPERSIONS OF GRAPHITE, MOLYBDENUM DISULFIDE, AND OTHER SOLIDS

COLLOIDAL GRAPHITE PROVES IDEAL AS FORGING LUBRICANT

Lubricants to be suitable for use on forging dies for steel and nonferrous metals must be stable under the high temperatures and pressures involved. Besides providing the most effective lubrication for hot-work dies, 'dag' brand dispersions act as coolants. Total advantages gained by using Acheson colloidal graphite, as described in the following applications are: improved quality of the forging, reduced die wear, lower production costs, and improved working conditions.

'dag' dispersion improves quality, cuts costs for Utica Drop Forge and Tool Division. With a large share of their capacity being devoted to the forging of jet engine blades, Utica finds it must maintain high production, consistently high quality, and a competitive price. Blade-forging dies have a comparatively short life due to rapid wear caused by the thinness of the blades, the high pressures required to form the heat-resistant alloys used, and the closer tolerances required. They have found that *every one* of these requirements can be met by using 'dag' colloidal graphite dispersed in water as their forging lubricant. First, it must withstand temperatures which range from 1950-2200° F. Sprayed on both halves of the die it forms a tightly adhering, smooth, microscopically-thin film that aids metal flow and substantially protects the die itself. In many cases, this has meant fewer finishing operations and therefore higher production, due to the improved quality of the blades. A compressor blade formerly required four blows from upset to finish, with an intermediate heat and tumbling operation. Now, this operation is done in only two blows from original heat. The savings . . . $16,000 a year on this part alone! Add increased life of these precision dies and you can appreciate what a 'dag' colloidal graphite dispersion means to efficient forging. Utica finds water-based dispersions best for press forging, and colloidal graphite in oil the best lubricant for hammers.



Operator spraying colloidal graphite on both top and bottom die halves before forging jet engine blades at Utica Drop Forge and Tool Division, Kelsey-Hayes Company.

Concentrated Acheson colloidal graphite being applied to die surfaces before they are put in service.

Pre-treatment and operational use of 'Aquadag' greatly increases die life. Before putting dies into service, a prominent midwestern manufacturer finds that by preheating them to about 250° F. and brushing on a dispersion of colloidal graphite in water, they have generally *doubled* the working life of their dies. When used as an operational lubricant, die wear on a truck body brace die was proved by actual measurements to be only *one-third* the former rate. And this was with 'Aquadag' diluted 1 to 240 in water! . . . Ample proof of the wide coverage, film toughness, lubricity, and basic economy of a "dag' brand dispersion.

Colloidal graphite is resistant to heat, does not react with the die steel, and the extremely small particle size permits an actual adsorption to the metal surface. A water carrier eliminates the usual smoke and fumes thus affording better working conditions and keeping die temperatures down. After the carrier evaporates, a dry graphite film remains which, besides being an efficient lubricant, protects the die from the accumulation of abrasive dust and scale. Die life is extended from 8 to 14 days and production increased by the reduction in downtime.

Specially compounded, ready-to-use forging lubricants containing 'dag' colloidal graphite are available from industrial lubricant suppliers. If you have a forging lubrication problem, it may pay you to call in your Acheson Service Engineer.

Write for additional information contained in Acheson Bulletin No. 426. Address Dept. S-39.

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

Offices in: Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee New York • Philadelphia • Pittsburgh • Rochester • St. Louis

W. H. LEE
Electric Products post

ROBERT L. ASHLEY
Silicon Transistor president

JOSEPH N. KUZMICK
Raybestos-Manhattan div. mgr.

JOHN B. WILSON
Standard Pipeprotection exec.

JOSEPH K. SEYLER
J&L supt.-cold finishing

H. G. COFFEY
Aetna-Standard v. p.-gen. mgr.

ern territory for **O. Hommel Co.** He is in Nashville, Tenn.

John B. Wilson was elected to the new post of executive vice president, **Standard Pipeprotection Inc.**, St. Louis. He was vice president and treasurer.

K. M. Patterson fills a new post, manager of headquarters sales departments, Apparatus Div., **Westinghouse Electric Corp.**, at East Pittsburgh, Pa. He is succeeded as manager of the division's industrial sales department by **C. E. Hammond**, former assistant manager for the division's South Pacific district, Los Angeles.

Richard E. Kimball was made district sales manager of a new sales office in Seattle opened by **Graver Tank & Mfg. Co.**, a division of Union Tank Car Co.

At the Boston plant of **Joseph T. Ryerson & Son Inc.**, **Joseph A. Moran** was named sales manager; **Arthur B. Burke** and **Napier B. Caldwell**, district sales managers.

Joseph K. Seyler was appointed superintendent-Cold Finishing Dept. at the Pittsburgh Works of **Jones & Laughlin Steel Corp.** He succeeds **H. W. Callahan**, retired. Mr. Seyler was assistant superintendent-Cold Finishing Dept. in charge of the Hazelwood operation of the works.

H. G. Coffey, former president of **Aetna-Standard Engineering Co.**, was named vice president-general manager of **Aetna-Standard Div.**, Blaw-Knox Co., Pittsburgh. Properties of Aetna-Standard were acquired by Blaw-Knox in February.

Dr. Richard W. Fountain and **Dr. Milton Stern** were appointed technical supervisors in the Metals Research Group, Technology Dept., **Union Carbide Metals Co.**, Niagara Falls, N. Y., division of Union Carbide Corp.

Warren L. Hardy was appointed manager of marketing research for abrasive products at **Norton Co.**, Worcester, Mass. He was manager-business research.

W. H. Lee was appointed director of research and engineering, **Electric Products Co.**, Cleveland. Prior to joining Electric Products, he spent four years in Oak Ridge, Tenn., as chief engineer of Edenfield Electric Inc.

Robert L. Ashley was elected president, **Silicon Transistor Corp.**, Carle Place, N. Y. **Harold Sandler** was elected chairman and treasurer; **Donald Des Jardin**, vice president and secretary; **Randolph Bronson**, vice president.

Joseph N. Kuzmick was appointed manager, **Manhattan Rubber Div.**, Passaic, N. J., Raybestos-Manhattan Inc., succeeding **John H. Matthews**, executive vice president, who retired from general management of the division, but continues with the company as a consultant. Mr. Kuzmick was co-ordinator of corporation research and development. He is assisted in his new post by **Clarence P. Schneider** as assistant to the divisional manager. Mr. Schneider was general manager, Wabash Div., Crawfordsville, Ind. Two manufacturing general managers appointed in charge of Manhattan division production departments are **Robert J. Gorecki** and **Wilder E. Perkins.**

Dugald Black, former director of labor relations, **Bendix Aviation Corp.**, Detroit, was appointed vice president in charge of industrial relations, and a member of the administrative committee. **M. A. Heidt**, Bendix vice president, formerly in charge of industrial relations, plans to retire Oct. 1. He is now serving on the staff of **M. P. Ferguson**, Bendix president.

Melvin J. Greaves was appointed chief engineer, Metals Div., **Arthur G. McKee & Co.**, Cleveland. He was assistant chief engineer.

OBITUARIES...

Paul D. Wood, 62, director of industrial relations, **Alan Wood Steel Co.**, Conshohocken, Pa., died Mar. 18.

P. W. Litchfield, 83, honorary chairman, **Goodyear Tire & Rubber Co.**, Akron, died Mar. 18.

Stevenson H. Evans, 78, secretary, **Trico Products Corp.**, Buffalo, died Mar. 16.

"My name is Frank Rackley—I'm president of the Jessop Steel Company. I've had this ad designed because I hate to beat around the bush . . . we want your business because we want continued growth. It's just as simple as that!

"You'll get faster deliveries of steel tailor-made to your specifications because there's a big difference at Jessop . . . we call that difference *flexibility*.

"As one of the largest integrated mills of its kind, we melt and finish under one roof. You see, at Jessop management and production work as a team to co-ordinate our every resource for the benefit of our customers. We believe in service and we have the flexibility to put it into practice.

"That's our story . . . short and to the point. If faster delivery of higher quality specialty steel makes sense to you, we'd like to do business. Just specify Jessop . . . you have my word our team will do the rest."

Frank B. Rackley, *President*

VMA 6505

JESSOP
STEEL COMPANY
Washington, Pennsylvania
OFFICES IN PRINCIPAL CITIES

Stainless, alloy, tool, cast-to-shape, and forging steels, precision ground flat stock, and other specialty steels

Ten-Year Building Boom Seen by Foy

A TEN-YEAR BOOM for the construction industry is forecast by Norman W. Foy, vice president in charge of sales, Republic Steel Corp., Cleveland. It will average about $80 billion a year—about the same size as the federal budget.

"During the next ten years, $500 billion to $600 billion worth of services and labor will go into the new construction market and $200 billion to $300 billion into maintenance and repair.

"The construction industry took 10.5 million tons of steel in 1958—almost one-fifth of all the steel shipped by the industry. In 1959, there are going to be a lot of records set in construction," he stated.

• **GNP Rising** — In commenting on the nation's business, Mr. Foy predicted a gross national product of $475 billion this year, with steel leading the way. "We are talking a 25 to 30 per cent increase in steel production this year, compared with an 8 to 10 per cent increase in general business," he said.

Reasons cited for the pickup in steel include the rapid accumulation of inventory by steel consumers since the start of the year, along with the increasing activity in the automotive, oil and gas, machinery, and construction fields.

In talking about the outlook for our economy for the next ten years, Mr. Foy pointed out that a population of 180 million is predicted by 1960. There may be a population of close to 210 million ten years from now. "This will bring a need for more homes, schools, offices, stores, factories, and institutions, resulting in the increased construction volume," he said.

Firm Expands Annealing

A new furnace will expand the vacuum annealing facilities for special metals of Wrought Products Div., Mallory-Sharon Metals Corp., Niles, Ohio. The furnace, equipped to operate at temperatures up to 1950° F, will anneal special structural shapes in addition to conventional mill shapes. It is to be completed by the end of the year.

Wire Capacity Boosted

National-Standard Co., Niles, Mich., will increase its capacity for the production of copper plated steel wire. A 45,200 sq ft addition, scheduled for completion July 1, will give the firm 423,200 sq ft of manufacturing space.

Green Expands Research

A. P. Green Fire Brick Co., Mexico, Mo., has expanded its research and testing facilities. Eight natural gas reheat furnaces and three cam type program control systems have been installed.

ASC Closes Gibson Plant

Associated Spring Corp., Bristol, Conn., plans a new plant to replace the manufacturing facility of its Gibson Div., Chicago, which will be closed sometime after July 1. Until the new plant starts operating, customers will be served by other divisions.

High labor rates, low productivity, and expensive maintenance of an old, inefficient layout prompted the decision.

GE Ups Casting Capacity

Completion of a $3.7 million expansion program in September will double the steel casting capacity of General Electric Co., Schenectady, N. Y. An electric arc furnace capable of melting up to 200,000 lb of steel or high grade ore is included in the equipment to be installed.

Ziegler Adds Tubing Line

Ziegler Steel Service Corp., with warehouses in Los Angeles, North Hollywood, and Oakland, Calif., has started stocking cold rolled electric weld tubing in rounds and squares.

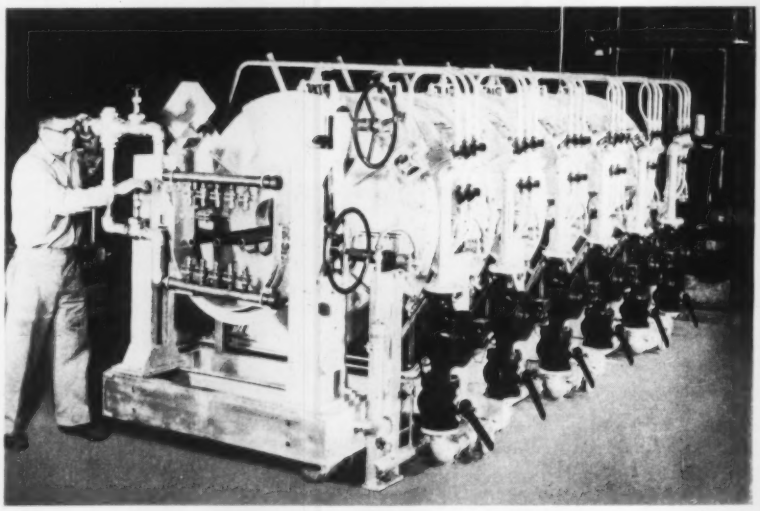
Tri-Seco Inc. Organized

Tri-Seco Inc., 7 W. Broad St., Mt. Vernon, N. Y., has been formed to sell and distribute machine and cutting tools, precision gages, and related equipment.

Potter & Johnston Moves

All operations of the Potter & Johnston Co., subsidiary of Pratt & Whitney Co., will be moved from Pawtucket, R. I., to the parent company's plant in West Hartford, Conn.

Consolidation of engineering and



THIS CONTINUOUS AUTOMATED FURNACE line simultaneously anneals three strands of stainless steel tubing 5/8 to 5 in. OD. The six barrel unit was designed and built by Selas Corp. of America, Dresher, Pa. Automatic temperature control is in three zones, to deliver tubing at 2100° F to the quench at the discharge end. Rated production is 1985 lb per hour, based on 2 in. OD tubing at 3.72 fpm

manufacturing functions of the machine tool firms is expected to provide more efficient techniques and add facilities for producing the Potter & Johnston line. The new mailing address is Charter Oak Boulevard, West Hartford 1, Conn.

Research Facility Planned

Metal & Thermit Corp., Rahway, N. J., will expand its electrochemical research and development activities. The firm has purchased previously leased facilities in suburban Detroit for a research laboratory and pilot plant.

American Hose Renamed

The name of American Metal Hose Div., American Brass Co., Waterbury, Conn., has been changed to Anaconda Metal Hose Div. The move was made to achieve a closer tie-in with Anaconda trademarked products.

REPRESENTATIVES

Industrial Products Sales Inc., Akron, has appointed G. Kenneth Nouse manager of sales, northern Ohio district. The firm handles steel forgings, stampings, tubing, ball bearings, aluminum and zinc diecastings, and injection and molded plastics.

NEW PLANTS

A. O. Smith Corp., Milwaukee, has opened a branch product service building, 754 Miami Circle N.E., Atlanta, to serve the Southeast. J. A. Snyder is manager.

Valk Mfg. Co., Carlisle, Pa., will build a new plant at Pell City, Ala., to make steel blades for construction machinery and allied products. Construction is to start immediately.

Southwestern Electronics Co., Houston, has opened a new 300,000 sq ft research, development, and manufacturing facility at 10201 Westheimer. The firm will produce electronic instrumentation at the site.

CONSOLIDATIONS

Circuit Instruments Inc., St. Petersburg, Fla., a wholy owned subsidiary of **International Resistance Co.,** Philadelphia, has been merged with the parent company. It will be known as the Circuit Instruments Div. The firm makes automation and atomic installation electronic equipment, and related devices.

Union Forging Co., Endicott, N. Y., will be controlled by **United Industrial Syndicate Inc.,** New York, upon stock purchase this spring.

Aeronca Mfg. Corp., Middletown, Ohio, and **Longren Aircraft Corp.,** Torrance, Calif., will merge. The action, approved by stockholders, will be effected about Apr. 3.

Cambridge Corp., Lowell, Mass., a wholly owned subsidiary of **Carrier Corp.,** is to be merged into the parent company. It will operate as Cambridge Co., a division of Carrier Corp.

Aetna-Standard Engineering Co., Ellwood City, Pa., has been acquired by **Blaw-Knox Co.,** Pittsburgh. It is now operating as a separate division of Blaw-Knox. E. E. Swartswelter, former chairman of Aetna-Standard, is expected to become a member and vice chairman of the Blaw-Knox board.

Safety Electrical Equipment Corp., a newly formed Ohio corporation, has obtained the assets of **Electrical Div., Safety Industries Inc.,** Hamden, Conn. It will continue operations at Hamden. Robert B. Dodds becomes executive vice president in charge of operations. John J. Kennedy becomes vice president in charge of sales.

Textron Inc., Providence, R. I., will acquire more than 80 per cent of the stock in **Nuclear Metals Inc.,** Concord, Mass. The stock is being sold by Memorial Drive Trust, profit sharing retirement fund for employees of Arthur D. Little Inc.

Bay State Tap & Die Co., Mansfield, Mass., has become a subsidiary of **Cleveland Twist Drill Co.,** Cleveland. Operations will continue at Mansfield with Louis A. Lincoln remaining as president.

Eldon Mfg. & Engineering Co., Milwaukee, has been purchased by Donald S. Greenbaum. The firm makes tubular metal products.

Burndy Corp., Norwalk, Conn., will acquire **H. H. Buggie Inc.,** Toledo, Ohio.

Combustion Engineering Inc., New York, has acquired **General Nuclear Engineering Corp.,** New York. General Nuclear will operate as a subsidiary.

NEW ADDRESSES

Kaiser Aluminum & Chemical Corp. will move its general sales office from Chicago to Oakland, Calif. Requiring several months, the job will be completed about Sept. 1.

Abell-Howe Co., Forest Park, Ill., has consolidated all engineering, designing, construction, sales, and office facilities in a new executive building at 7747 Van Buren, Forest Park, Ill.

ASSOCIATIONS

Scientific Apparatus Makers Association, Chicago, has appointed Nicholas G. Geannopulos to succeed James R. Irving as director of public information. Mr. Irving is now executive secretary of SAMA's laboratory equipment section.

American Iron Ore Association has moved to 600 Bulkley Bldg., 1501 Euclid Ave., Cleveland 15, Ohio.

Hoist Manufacturers Association, Washington, has elected the following officers: Milton L. Aitkin, Robbins & Myers Inc., Springfield, Ohio, president; John S. Jackson, Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., vice president; Carl O. Hedner, William C. Miles, and Raymond C. Blair, directors. Joe H. Peritz was re-elected executive secretary and treasurer, and C. M. Dinkins, general counsel.

Philadelphia Gear announces...

a major breakthrough to new standards in precision grinding of speed reducer gearing... *So advanced* that conventional standards of accuracy have suddenly become out-of-date. *So significant* that you can solve drive problems you could never solve before... because you get engineering advantages that have never been available before.

IMPROVED ACCURACY

For the first time, standard commercial speed reducers are available with gearing of master gear quality.

LONGER LIFE

Extreme accuracy of profiles, profile spacing and surface finish completely eliminates "running in" periods and resulting wear on gearing.

REDUCED BACKLASH

Precision ground gearing means reduced backlash for reversing drives... plus uniform backlash where precision of movement is important.

100% INTERCHANGEABILITY

Duplicate units or spares can be installed with original manufacturing tolerances duplicated exactly.

SPACE AND WEIGHT SAVINGS

Use of harder materials plus reduced load factors save weight and space without sacrificing performance characteristics.

REDUCED VIBRATION

Reduced tooth to tooth errors, accumulated pitch errors and total composite errors give smoother contact.

HIGHER SPEEDS

Dynamic load factors are materially reduced. Reducers can operate at higher speeds... have increased load carrying capacity.

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For any application where low sound levels are important, gearing noise is no longer a controlling factor.

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Technical Outlook

March 30, 1959

EXPLOSIVE PREDICTIONS— Within the next five years you are going to see sheets made from blooms by explosive methods. It will require new machinery and new concepts, says Keith Wilhelm, consultant, Encino, Calif. He saw sheets being made by this method in a mill at Stuttgart, Germany. A bloom about 3 by 4 in. was literally blown up to 36 by 48 in. Gage varied less than 0.001 in. Metallurgy: Fine grain, well worked, completely homogeneous. Other predictions: Extrusions with complex shapes and walls 0.025 in. thick and spans up to 3 in.; forgings made with tolerances closer than those of machined parts.

RARE EARTH MADE AVAILABLE— Neodymium, a rare earth which appears to be capable of increasing the heat resistance of magnesium for aircraft and missile uses and may have application in steel and aluminum alloys, is being produced in industrial quantities by Nuclear Corp. of America, Burbank, Calif. The material has a melting point of over 1800° F and a boiling point of over 5400° F. While it is one of the more abundant rare earths, only recently has a process been developed for extracting and reducing it to commercial purity.

BIRDYBACK TRAILERS— Large magnesium vans, light enough to be carried aboard airplanes, have been put into service by the National Bureau of Standards for scientific fieldwork. One van houses 6000 lb of electronic equipment; the other is equipped with a stove, refrigerator, and bunk beds to serve as living quarters for four men. Skid mounts enable the van to be dragged on the ground. Use of a detachable running gear converts it to a semitrailer.

MORE OXYGEN CUTTING SEEN— Cybernetics (automation) is the key to important advances in oxygen cutting processes, says Richard L. Deily, Messer Cutting Machines Inc., New York. Mr. Deily cites the application of electronic controls to oxygen cutting machines which now permit the use of scale drawings and remote control for many operations. Taped information from computers can be analyzed and used for furthering such processes, he adds. Among the fields which offer great promise for oxygen cutting systems are hot cutoff in steel mill rolling lines, plate edge preparation, and integration of manufacturing operations using steel plates.

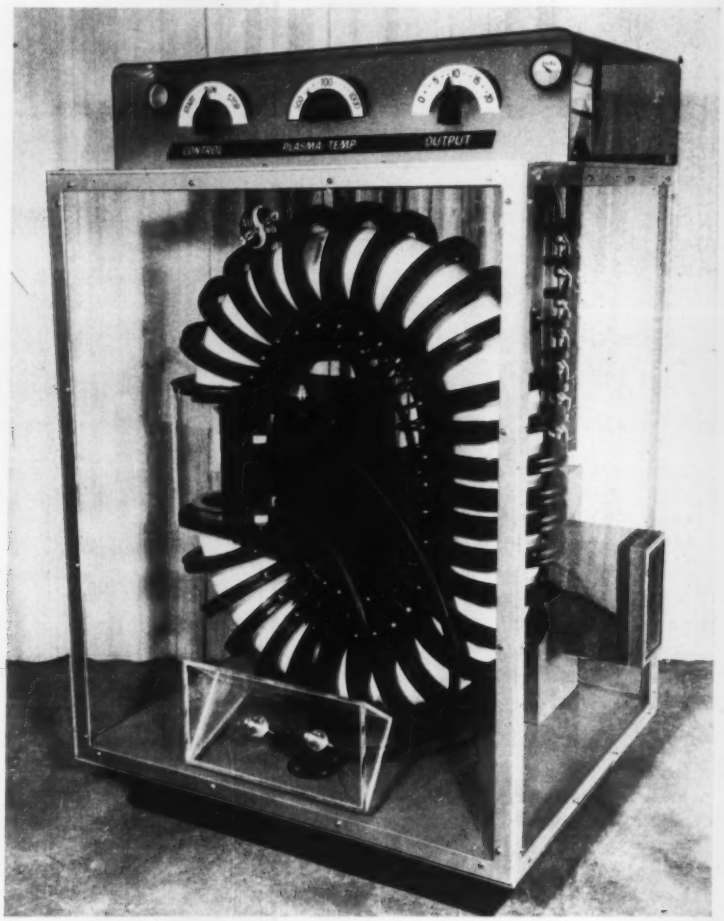
USEFUL DUCTILITY— The increased use of high strength alloys in the aircraft industry has emphasized the need for more accurate knowledge about ductility. Conclusions of a study made by Battelle Memorial Institute, Columbus, Ohio, indicate that uniform elongation may be a more significant index of ductility than is the more commonly used total elongation. But since the effect of cross sectional area on uniform elongation is not known, Battelle's researchers suggest further studies before uniform elongation or similar indexes are used.

MORE ON EXPLOSIVE FORMING— Missiles and explosives naturally go together. Boeing Airplane Co. is now using the force of explosives to shape the fuel tank of the Bomarc. The tank is welded from high strength alloy steel and heat treated. No matter how carefully the job is done, the tank walls warp a little. So Boeing engineers put the tank in a two piece sizing die, fill it with water, and set off an explosive charge in the flooded tank. The tank comes out smooth, and its size is perfect.

STAINLESS 'PAINT' COMING— Firewalls in jet aircraft engine compartments and other areas subjected to tremendous heat may soon be protected by a stainless steel powder "paint" that uses sodium silicate as the vehicle. The dry film is said to weld to the base metal at 1700° F and does not flow even at 2000° F. Silicate has been similarly used with copper, nickel, and chromium powders in the heat treatment of alloy steels for protection against carburization.

What's Coming In Welding

Here are the predictions of a dozen authorities. In evaluating their research and development efforts, they say you'll be using some fantastic devices in five or ten years



This proposed power unit would use deuterium (heavy water) to generate electricity for welding. This size would produce 20,000 kw, says A. O. Smith Corp., Milwaukee

HOW would you like to weld carbon steel at 1000 fpm with a self-contained power source that never wears out?

Or own a welding torch that raw recruits could use in any position on any kind of metal and get perfect results welding, brazing, hard facing, or cutting?

Or buy an automatic welding machine whose builder would guarantee perfect results every time you use it?

Or use base metals of a composition that practically eliminates all side effects like brittle cracking and undercutting?

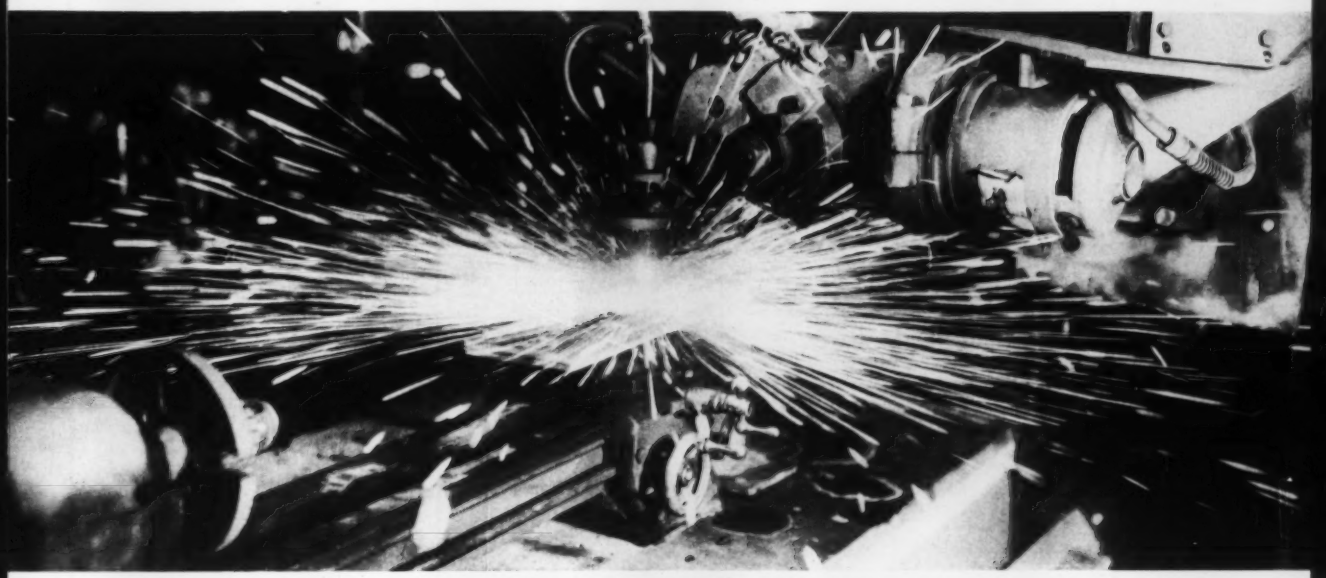
It won't be long before you'll be able to do all of those things and more.

To aid metalworking managers in their planning, the editors of STEEL had the veil of tomorrow lifted a little in a series of interviews with leaders in welding. Here's what they learned.

• **Advanced Thinking**—A. O. Smith Corp., Milwaukee, has some startling ideas. Visitors at next week's National Welding Exposition in Chicago will see a model of Stellarweld, a device that would employ deuterium (found in ordinary water) as a source of power. The power should cost only 1 per cent as much as electricity made from coal. In a portable size, the device will supply perhaps 20,000 kw. R. J. Keller, chief engineer, Welding Products Div., says it would pose no safety problems and be easily controlled.

G. R. Rothschild, assistant director, metallurgical research, Central Research Dept., Air Reduction Co. Inc., New York, also looks for more changes in power sources. "We used to think it was necessary for voltage to drop as current demand increased. Now we've swung away from that belief. It is sometimes better to have a constant voltage or even a slight increase as current demands rise."

The cost of converting alternating to direct current will drop as rectifiers improve, says Arthur Johnson, manager of welding equipment engineering and development, Weld-



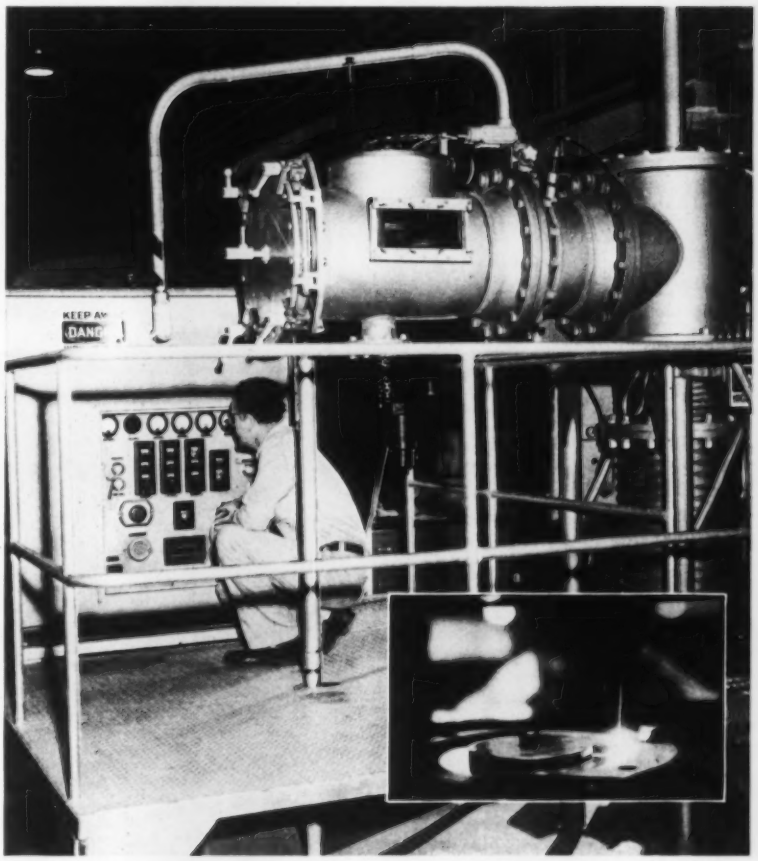
Plasma jets will invade a wide variety of welding jobs now done with an oxyacetylene flame. The Linde Co. version here puts a stainless coating on an aluminum plate

ing Products Div., A. O. Smith Corp. Hafnium is the latest element in a long list of rectifier materials that hold promise. Its use may increase over-all rectifier efficiency as much as 5 per cent.

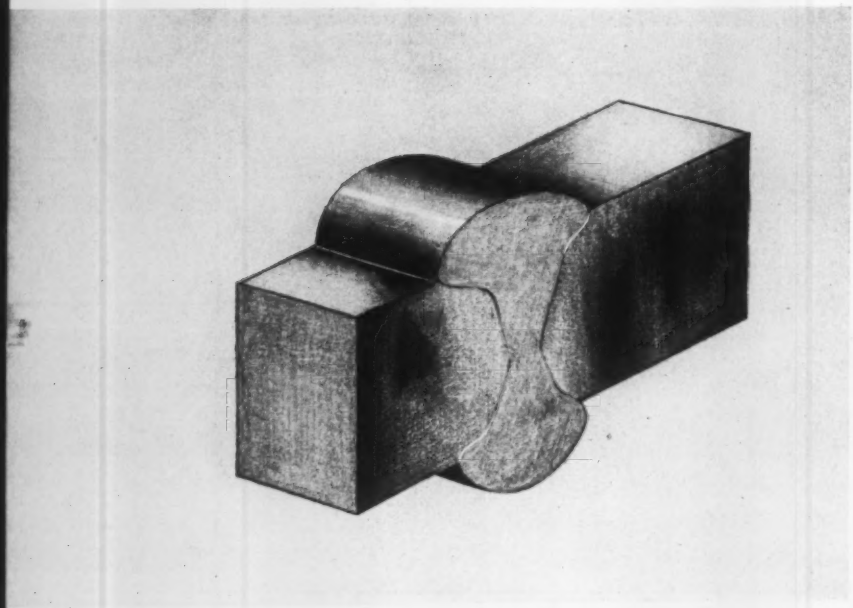
• **High Frequency** — At least two firms which make high frequency induction units are working on the continuous welding of thin steel. The product: Tin cans. Dr. H. B. Osborn Jr., Tocco Div., Ohio Crankshaft Co., Cleveland, says his firm's approach will develop 500 fpm but that 1000 fpm is practical if a way can be found to cut off at such speed. It makes welding cheaper than soldering.

Dr. Osborn gives these events top priority in his field: 1. Copper tubing will be welded from strip rather than extruded as it is today. 2. That will lead to larger welded brass and copper tubing which will be prefabricated into downspouts, traps, and drains ready for installation. 3. Completely portable, high frequency induction welders for buttwelding pipe lines, and boiler tubes will be available.

• **Advanced Manual Methods** — John F. Galbraith, manager, electric welding development, Linde Co., a division of Union Carbide Corp., New York, says: "The plasma jet has many interesting possibilities,



Electron beam welding in a vacuum has great promise for joining highly reactive metals like molybdenum. Inset shows beam at work in an Air Reduction Co. version of the method



Now you can weld 1 in. aluminum plates in two passes with no edge preparation. The development is said to have made possible a new ocean-going tanker for liquid propane

particularly where flames offer advantages over arcs. It will offer serious competition in many areas now dominated by oxyacetylene methods, especially cutting, welding, brazing, and flame plating."

This is one advantage: One torch welds and cuts; an operator can cut, fit, recut, and join with the same tool.

In some areas, a flame is superior to an arc, says Mr. Galbraith. That's especially true on thin metal, where the amount of current used is limited by the volume of metal around the arc. For example, if you get too much current going through an electrode for a given thickness and speed, you'll get undercutting which the flame of a plasma jet may eliminate.

There are two kinds of plasma jets—transferred and nontransferred arcs. The transferred arc is in commercial use—current is carried from the tungsten electrode across an arc to the workpiece.

Linde also has in development a nontransferred type which passes an arc between the electrode and torch nozzle. It has a wider range of heat intensity and can be used on nonconducting materials like ceramics.

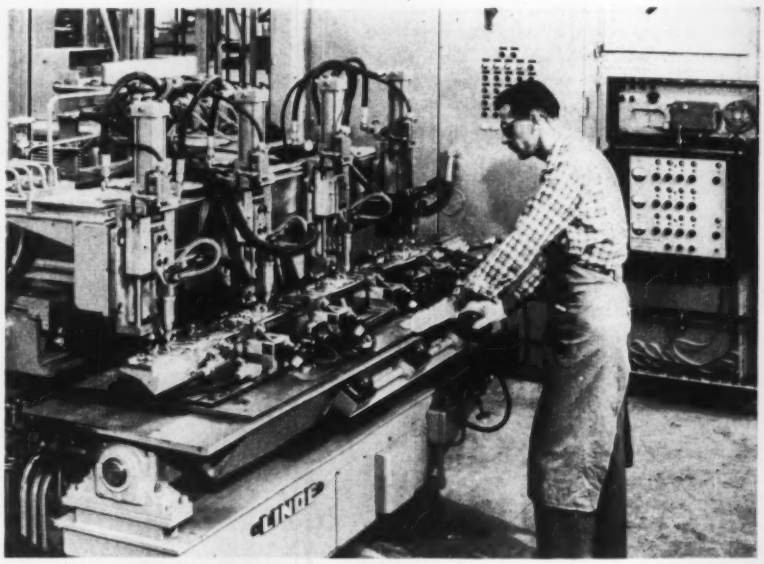
Plasma jets use an enormously wide range of power. At 10 kw, the device is fairly quiet and handles relatively thin metals. For other operations, you can put in 1000 kw. Although it seems noisy, no one at Linde regards this as an insurmountable problem.

A. F. Chouinard, director of research and development, National Cylinder Gas Div., Chemetron Corp., Chicago, says: "In plasma jets, we are simply heating a gas stream by electrical power and directing it onto a surface. Our next steps will be finding the gas that provides the right cutting action and materials which will stand such temperatures."

• **Upgrading Machinery** — Linde also believes that most people consider welding a pretty crude operation, in comparison with a machine tool.

It and many other firms are out to change that concept. Their aim: Completely automatic machines with complete control of welding variables—power, equipment, shielding, and feeds. "Fitups," says Mr. Galbraith, "may have to be as close as 0.001 in. Such equipment will achieve that same status and guarantees enjoyed by regular machine tools."

Some progress has already been made in that direction. A stainless coffeepot is welded automatically. Linde guaranteed the buyer he would not have more than 2 per cent rejects. STEEL verified the



Heliarc spotwelding will be getting more attention from airplane builders. This tape controlled machine puts down 2500 spots an hour on control fins for the Terrier missile

fact that the firm bettered the figure.

• **More Refinements** — W. J. Greene, associate director, metallurgical research, Air Reduction Sales Co., lists these trends as "most important in the next five to ten years":

1. More applications of feedback control to welding variables.
2. Automatic joint following.
3. Automatic cycling which will include provision for crater filling and special starting and stopping conditions.

The purposes, says Mr. Greene, are to produce quantity lots of identical pieces, to cut labor, and to obtain a high degree of reliability for aircraft, missiles, and space vehicles.

The consequences of adding more feedback control: 1. There will be no need for elaborate fixturing. (A universal machine will take over when you clamp a piece to its base.) 2. You won't need extensive fitups for ordinary jobs. (Linde believes in more accurate fitups.) 3. Less time will be needed for setups. 4. Investment per job will be less. 5. Designers of joints will be given greater freedom.

• **Spotwelding** — Linde thinks its pilot arc spotwelding process is going to take over much of that type welding in aircraft. (Other leading firms feel the same way about their versions.) The method makes good, consistent welds that are up to military standards, and you only need access to the weld area from one side. Another advantage: You can inspect the welds visually. (If you can see a nugget, it's a good weld.)

• **Basic Knowledge Needed**—"Before we can know what direction processes will take, welders must face up to the fact that we don't know enough about the metals we are welding," says Julius Heuschkel, manager, welding research, Westinghouse Electric Corp., Pittsburgh. He feels that welders have long been hypnotized by the word "stabilized." Yet cracking continues to be a problem. His business is finding out why.

His efforts are directed mainly at base and weld metals. He has already turned up some interesting facts. As austenitic stainless steel is heated, for example, it encounters several brittle points. It is dead brittle at 100° F below its melting point.

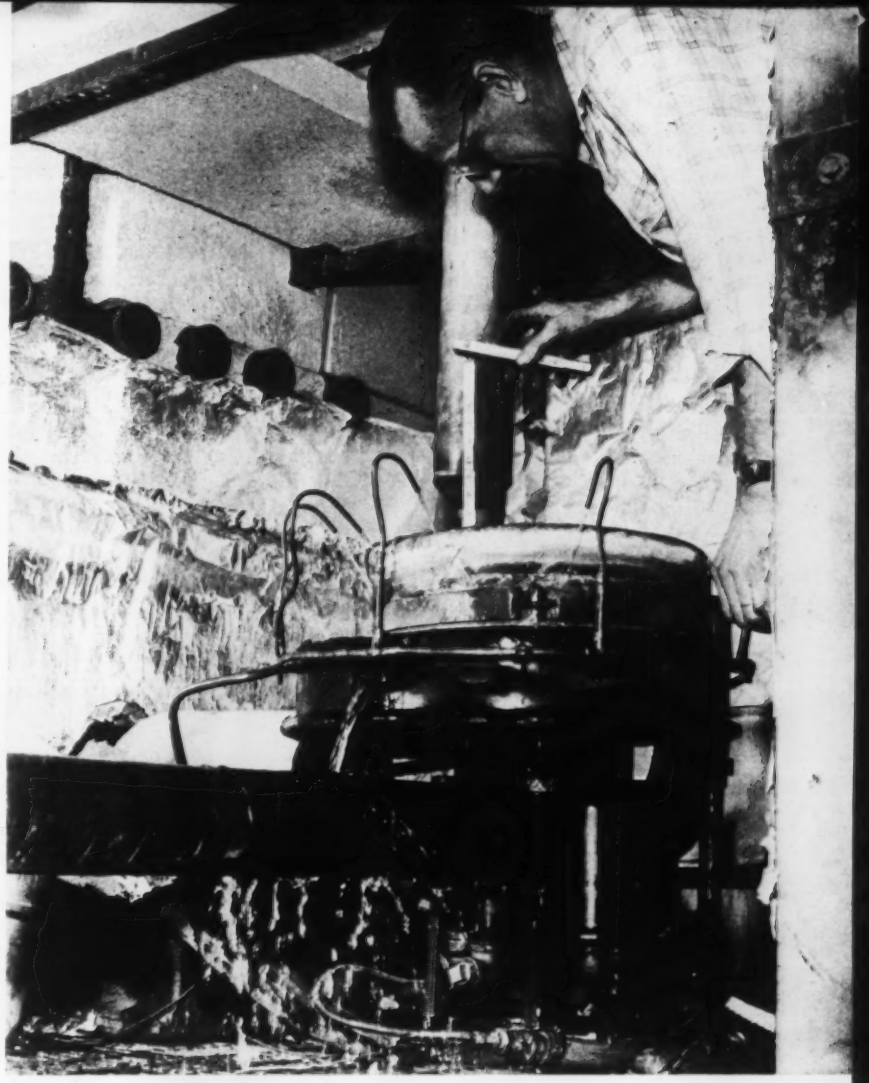
NCG's Mr. Chouinard feels that much can be learned from atomic structures and the nature of molecular bonds. "Once we know what's holding them together, we can find better ways to join metals."

Battelle Memorial Institute, Columbus, Ohio, is also keenly aware of problems in materials. Perry Rieppel, chief of Metals Joining Research Div., cites CO_2 welding as an example of empirical information overrunning knowledge of principles. After ten years of field use, no one has much of an idea of why it works. Additional research, he says, will certainly lead to applications beyond our imagination.

• **Miscellaneous Devices**—The latest inert gas process uses small diameter wires and low voltages to speed up and simplify the welding of light gage metal. It's an example of break-the-barrier thinking.

For a long time everyone knew that below 22 volts you got a drop transfer of melted electrode rather than the ideal spray type. But no one dreamed that an arc below 15 volts would also be extremely useful.

The low voltage range is an un-



Most authorities want more information on fundamentals before going ahead with new processes. Linde Co.'s Speedway Laboratory, Indianapolis, is exploring 10,000-ampere currents to get better plasma jets

dreamed of field for welding. Here are the advantages of the Linde short arc process (Airco calls its version Dip Transfer): An unskilled person can learn to make good quality welds in 30 minutes. He can weld in all positions at about the same rate of speed. He can bridge a 3/8 in. gap. The range is 14 to 19 volts.

Linde reports sheet metal fabricators are excited about results. It goes along with the idea that carbon steel will be the big field although the process is also oustandingly good on stainless. The claim: The method is unsurpassed for metals 0.030 to 0.25 in. thick.

• **Another Comer**—A late development is electron beam welding. A special method, it needs a fairly expensive vacuum furnace in connection with the welding equipment, but results on highly reactive and contamination sensitive metals are good enough to justify the expense, says Airco.

The electron beam gives an operator great control of the amount of heat. Vacuum keeps out impurities and even improves the weld deposit. Also, the heat affected zone is extremely narrow, welds are stronger, more ductile, and have a nicer contour than their airwelded counterparts.

• **Strong Foundation**—J. J. Chyle, director of welding research for A. O. Smith Corp., says you can look for improvements in conventional electrodes. The new ones will have higher deposition rates, and they'll leave a smoother bead. Another development not too far off: Electrodes that are impervious to moisture pickup and prevent a breakdown of moisture into harmful hydrogen.

• **Look for Competition**—Here is the consensus on processes competing with fusion welding: Adhesives, ultrasonics, cold pressure welding, explosive forming—in that order.

Adhesives will continue to make inroads in areas where temperature is not important, although A. O. Smith says glass is a potential high temperature adhesive.

Ultrasonics will play an important role even though some critics question joint quality and stability. But the method is highly regarded, especially for joining aluminum foils to each other or to heavy sections. Aeroprojects Inc., West Chester, Pa., (one of the leaders) is joining heavier sections and says there is much promise in joining harder materials like stainless.

One company hints that ultrasonics is a natural field for exploitation by resistance welding firms. Their expert knowledge of machinery should stand them in good stead.

Explosives have produced some excellent molecular bonds. Battelle Memorial Institute and National Northern Corp., a subsidiary of American Potash & Chemical Corp., West Hanover, Mass., are impressed with results.

Explosive forming is a threat since it can produce unusual deformations and configurations which eliminate joints.

High strength bolting is still a sturdy contender, says Fred Plummer, national secretary, American Welding Society, New York. He thinks we'll be seeing more shop welded structurals joined at the site with high strength bolts. He adds: "There is definitely a place for the technique."

• **Summing Up**—It's curious that often the first things discovered about a process are the best ones. At least one welding engineer believes that the simple pressure weld is the best. "You simply heat two edges and jam them together. If someone will invent a way to do this consistently and easily, everyone will be able to get top grade welds consistently. Welding time is the same for large or small pieces."

That's the way the blacksmith used to do it.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Tests Novel Control For Air Pollution

Bag type filters for open hearth stacks being tried by Bethlehem Pacific Coast Steel Corp.

HELP may be on the way for companies that want to dispose of solid particles in gases from their furnace chimneys. An antipollution system is being tested on open hearth stacks at the South San Francisco plant of Bethlehem Pacific Coast Steel Corp.

• **King Size Vacuum Cleaner**—The system includes seven glass fabric bags, designed to withstand high temperatures. They're impregnated with silicone. Each bag is 1 ft in diameter and 20 ft long.

The unit operates like a vacuum cleaner; a fan draws gases from the open hearth chimney and forces them into the bags, where filter action removes solid material.

Bags are emptied periodically by reversing the flow of gases. Grouping and valving of the bags permit continuous cleaning of stack gases.

• **Anticipated Rules** — Several months ago, when the company foresaw regulations to control air pollution in the San Francisco Bay area, it began a study of solids in chimney gases and possible ways to remove them, reports L. A. Anderson, general manager of the plant.

First phase of the program was to find out how much and what kind of solids were being blown out the stacks. The material was found to be mostly metallic oxides, neither toxic nor corrosive.

Currently, the bag house is being tested as a collection system. Other devices, such as electrostatic precipitators and scrubbers, may be tried. High temperatures and large volumes of gases generated by the steelmaking process make it hard to find a collector that's effective.

After evaluating a number of systems, the company will install equipment to meet or exceed proposed smoke abatement regulations.

Titanium Ingot Melting Process Cuts Impurities

A NEW titanium ingot melting technique can hold oxygen and nitrogen contamination under 0.1 per cent, says Johnson & Funk Metallurgical Corp., Wooster, Ohio, a subsidiary of Mallory-Sharon Corp. The patented process is used to melt ingots 12 in. in diameter.

Because oxygen and nitrogen are major contaminants, ingots are

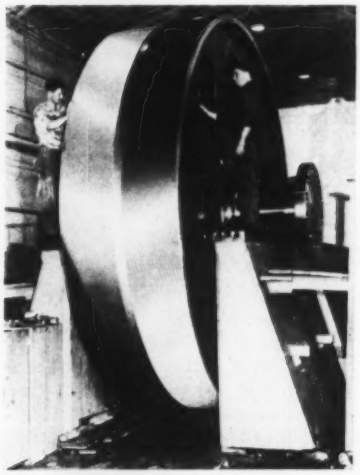
usually melted in a vacuum or inert atmosphere. But the method does not solve the problem of oxygen and nitrogen within the metal itself.

Johnson & Funk's solution: Arc melting of titanium and its alloys with an electrode containing titanium and another metal. (Not identified, it is more reactive to oxygen and nitrogen than titanium.)

• **Operation**—A consumable titanium electrode and a small percentage of the contaminant removing metal is placed in the furnace well. The second metal boils off at about 2730° F (below titanium's boiling point). The gas expands around the arc and combines with the nitrogen and oxygen in the titanium.

The resulting highly volatile oxides are drawn off and do not recombine with the titanium. Embrittlement problems are eased; the solubility limit of oxygen in a vacuum melted titanium ingot is reduced from 12 per cent to less than 0.1 per cent.

Johnson & Funk specializes in vacuum melting of special alloy steels, titanium, zirconium, and other special metals, as well as producing strip, wire, foil, and special shapes in those materials.



THIS 70,000 LB BULL GEAR manufactured by De Laval Steam Turbine Co., Trenton, N. J., will drive the atomic merchant ship, **N. S. Savannah.** The gear is 176 in. in diameter and 48 in. across its face. It will deliver power to the ship's single propeller. The 587 ft hull is being built in the yards of New York Shipbuilding Corp., Camden, N. J., and is expected to be ready for launching late this summer

Government Purchases Lag

Replacements are far off the pace, distributors are told. Only the Navy has kept up. Also, a new trade-in program may help some on replacement buying

MACHINE tool distributors wrestled with some of their industry's most painful problems at their meeting with government spokesmen in Washington.

Members of the American Machine Tool Distributors' Association were told: Although government is sympathetic to the industry's troubles, and although most of them will be solved, there is little chance for immediate relief.

One bright note: The Office of Civil & Defense Mobilization decision in the Greers Ferry Case (STEEL, Mar. 9, p. 38).

In this case, a domestic turbine builder was awarded the contract even though a foreign bidder was 17 per cent under the low American bid. (The maximum allowed is 12 per cent—if it runs more, the foreign builder gets the contract.)

Cheering this decision, distributors are anxious to get the same policy applied to government purchases of machine tools.

Here are a few problems aired:

• **Armed services lag on replacement purchases, but it's an old story . . . retold.**

Despite professed concern on the part of the armed services in maintaining up-to-date production facilities, spending is lagging far behind schedule. The refreshing exception is the Navy.

A total of $40 million was appropriated for the year ending in June, 1959. The Navy and Air Force got $20 million each; the Army took nothing. The Navy has spent roughly $17 million. The Air Force diverted about $17 million into other programs, gave $1 million to the Air Materiel Command (still unspent), and Pentagon officials are guessing that none of the remaining Air Force money will be used.

So, it looks as if less than half of the money appropriated for modernization will be used for that purpose. This has been true every year since 1952.

• **Pool order program now has contracts totaling $221 million.**

That represents 14,892 machine tools, about 92 per cent of the number that will be covered. Leo A. Hoegh, director, Office of Civil & Defense Mobilization, says he considers the program now "in full force." Contracts with 86 producers have been signed. They can be activated immediately in an emergency.

• **More surplus machines will reach the market this year.**

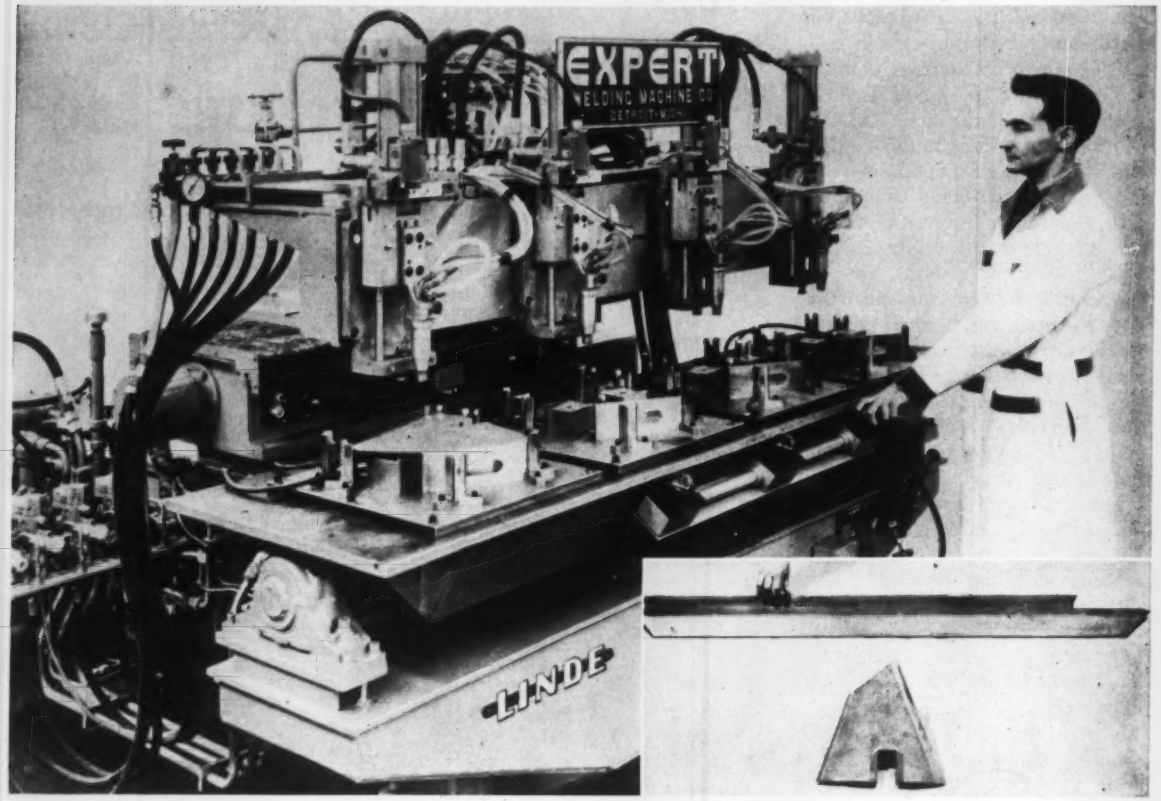
Roughly 24,000 government-owned machines may be declared excess. Of these, about 5000 will go into the national industrial equipment reserve; another 1000 will be swept up by other government agencies.

So 18,000 to 20,000 will be declared surplus. Of these, 10,000 will go to schools; 2500 are more than 18 years old; 1200 to 1500 are in sad shape or are too specialized to be marketable. The remainder, maybe 5000, will be offered for sale.

• **Trade-in program will free some dollars for government replacement.**

Soon to be inaugurated, a new policy of the Department of Defense will permit the services to trade in the old machines when they are replaced. This can be done by selling to the highest bidder, whether it's the new machine builder, a machine dealer, or a user. The money from the old machine can be applied to the new one.

Heretofore, the old machine had to go through complex screening. Then if it was sold as surplus, the money reverted to the Treasury Department's miscellaneous receipts.



A punched tape guides these Heliarc welding torches through complex cycles. These fixtures produce control fins for a missile—four at a time. The inset shows the elongated dorsal fin and the control fin

Tape Controlled Welding Is Paying Off at Convair

Missilemaker reports advantages include: Short setup time, precision, and repeatability. Single unit handles two jobs automatically in turning out Terrier fins

THE sleek dorsal fin on the back of the Terrier surface-to-air guided missile is airfoil contoured; it takes 730 spotwelds to keep it in shape. The Terrier's control fin requires 430 spotwelds.

One welding machine is doing both jobs automatically.

• **Payoff**—Biggest advantage of the new machine is that it can be switched from one job to another in a few minutes by changing the tape in the control and changing the fixtures on the table of the machine.

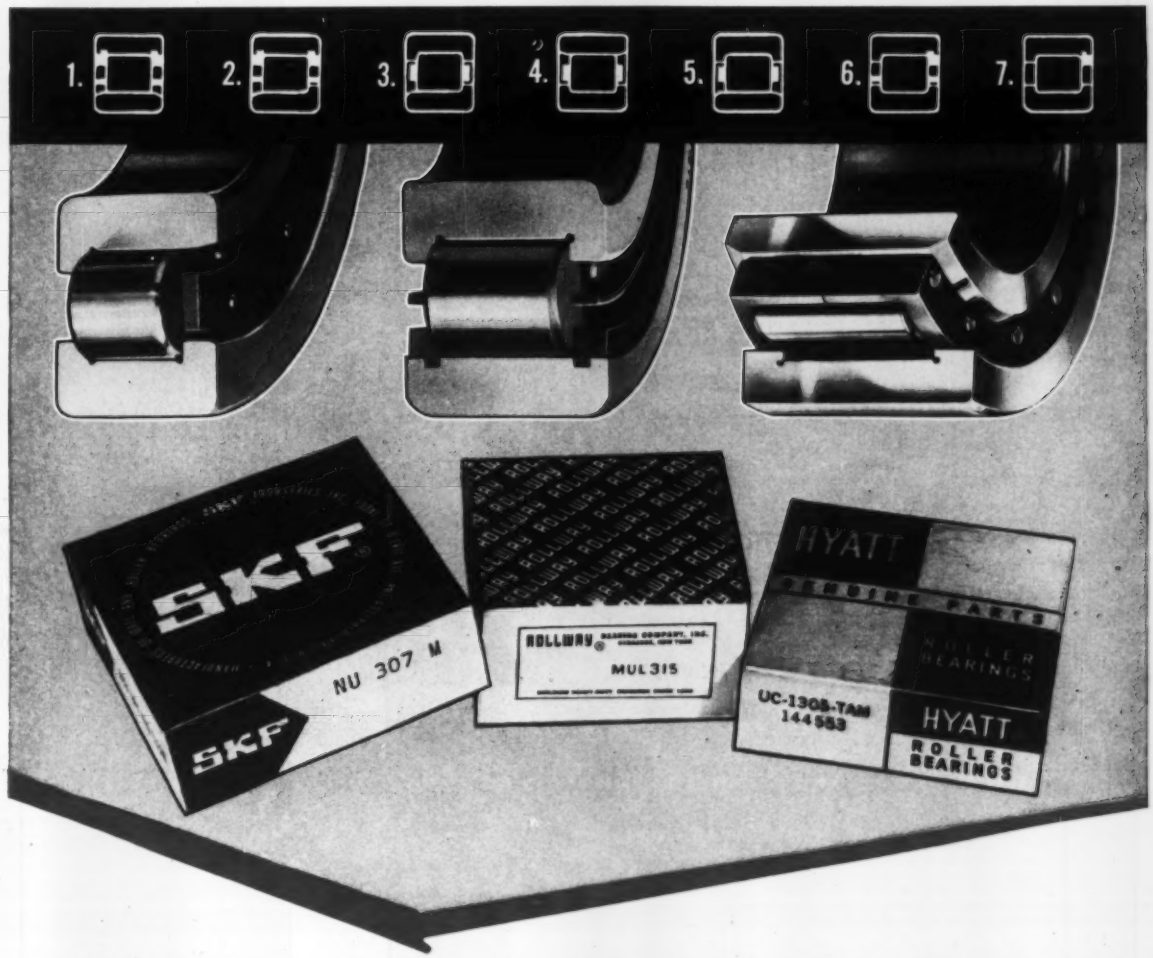
Other advantages of the machine being used at the Pomona, Calif., plant of Convair, a division of General Dynamics Corp.: It can turn out welds at high speed (2532 an hour on the control fins), while holding close tolerances on weld location (within 0.010 in.).

• **Machine Control**—The machine was designed by Linde Co., a division of Union Carbide Corp., New York. It was built to Linde specifications at the Welding Machine Div., Expert Tool & Die Co. Inc., Detroit.

Four mechanized Heliarc spotwelding torches are mounted on individual ball-bushing slides. They, in turn, are located on a horizontal beam attached by a knee section to a set of horizontal cross slides.

Because the airfoil parts are not flat, the table tilts 20 degrees in either direction so that the torches will be perpendicular to the parts at any weld position. Each torch covers a 20 by 20 in. area.

The punched tape contains all the necessary information to position the cross slides, control table tilt, select the right torch or torches, and pick weld time and weld current.



Suffixes and prefixes with a cylindrical roller bearing number spell a big difference in price and service . . .

Cylindrical roller bearings are manufactured in the variations shown above, as well as many others. They are supplied with separators of cast bronze or pressed steel. Some have a full complement of rollers, no separators.

Each *can* be called interchangeable with the other, yet *none* are. All variations are priced differently and each is designed to fit particular applications.

If you buy or authorize replacement bearing purchases, make certain you order by *all* suffixes and prefixes . . . Bearings, Inc. have complete stocks of all types in all sizes and can advise which is best for each application . . . Buy with confidence that the bearing you order will be the bearing you get. Call our nearest branch.

1. *Straight inner race; separator; retaining rings in outer race.*
2. *Single flanged inner race; separator; retaining rings in outer race.*
3. *Double flanged outer race; bronze separator; single flanged inner race.*
4. *Double flanged inner race; straight outer race; bronze separator.*
5. *Straight inner race; double flanged outer race; bronze separator.*
6. *Double flanged inner race; single flanged outer race; retainer on opposite side; non-separable; steel retainer.*
7. *Double flanged inner race; single flanged outer race, retainer on opposite side; non-separable; full roller, no separator.*

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As molten steel pours from the ladle into an ingot mold, a pressure gun sprays tiny lead pellets into the flow. The operation is timed with a stopwatch

Bessemers Used at Lorain To Make Leaded Steel

Converters help meet growing demand for metal that's easier to machine; consistent shop practice and new laboratory equipment assure better quality

DEMAND for leaded steel is growing rapidly.

You can expect to see continued building and expansion of facilities to make it.

One of the newer installations is at National Tube Div., Lorain, Ohio, United States Steel Corp.

• **Why It's Gaining**—Known for its machinability, leaded steel is gaining popularity among makers of screw machine products. End products are varied for use in household appliances, automotive and electrical equipment, and light industrial or business machinery.

Advantages of leaded steel over other types: Lower cost per finished part because of improved tool life and increased cutting speeds, and excellent machined finishes.

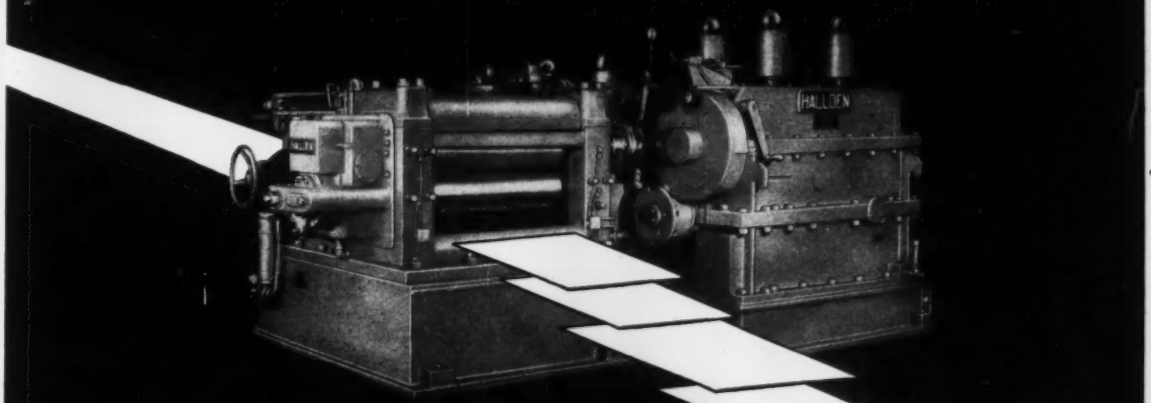
• **The Process**—Three welded shell, acid bessemer converters are used at Lorain. They make leaded steel in 60 ton heats.

The metal, before leading, is a special, resulfurized, free machining steel.

As molten steel is poured from the ladle into ingot molds, lead pellets, screened on plus 20-minus 40 mesh, are sprayed into the stream with an air pressure gun. Before air is forced into the lead pressure storage tank, it passes through an electric dryer. That prevents mois-

NOW - A NEW "*Push Button*" FLYING SHEAR

NO DOWN TIME to change cut length or synchronization



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Revolutionary new designs now permit synchronization adjustment AND gear changes to be made without stopping production. Changes in cut lengths are made in just seconds.

Hallden Shears can be furnished in processing lines built by leading machinery manufacturers the world around.

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Dial above pressure storage tank indicates weight of lead pellets it holds. Readings before and after pouring tell how much lead is used in a heat of steel

ture from collecting in the tank and interrupting flow of pellets in the gun.

• **How Lead Is Measured**—Most leaded steels contain 0.15 to 0.35 per cent lead. At National Tube, the addition is about 7 lb per ton of steel.

The storage tank is weighed before and after each heat is poured, to determine the exact amount of lead used.

Hoods for a fume exhaust system, extending to the tops of ingot molds, obscure the level of steel as ingots are poured. Addition of lead is timed with a stopwatch.

Pouring time for each ingot, time of the addition, and air pressure in the lead storage tank are carefully controlled.

As a heat of six, 10 ton ingots is poured, there are marked, predetermined changes in head pressure in the ladle; they're most evident in the pouring of the fifth and sixth ingots. Storage tank pressure and addition time are varied to put the right amount of lead in the steel.

• **Quality Control**—It's the practice of leaded steel producers to make metallurgical tests on each ingot (instead of each heat, as for other types of steel). To test the leaded product and improve quality control on other bessemer and open hearth steels, the company has installed new equipment for spectrographic analysis and wet chemical testing.

A spectrometer analyzes content of a sample in about 2 minutes. A single reading gives analyses for 13 elements; dual readings measure as many as 17 elements present in a sample.

Each ingot is tested for proper lead diffusion. Saw cut cross sections are heated to around 1300° F and held at that temperature for about 10 minutes. Size and distribution of beads of lead, on the sawed surface, indicate the degree of dispersion in the sample.

Heaters Fight Rust In Plant Warehouses

Units mounted in ceiling with fog eliminators keep stocks of pipe warm and dry

FLEXIBLE heating equipment can reduce rust damage to steel products while they're being made, processed, or stored.

Overhead heaters and fog eliminators keep stored steel pipe warm and dry at the Etna and Ambridge (Pa.) plants of Spang-Chalfant Div., National Supply Co., a subsidiary of Armco Steel Corp. The units were made by L. J. Wing Mfg. Co., Linden, N. J.

• **Mounted in Ceiling**—Large areas with high ceilings are kept warm by overhead revolving heaters with four way discharge outlets. Fans blow air downward, through steam coils and discharge outlets, to the working level.

In the finished goods warehouse and the shipping department for small electrical conduit, ten of the units heat two 86 by 378 ft bays. Pipe is stacked high in racks to save space; all sides of the stored material are heated uniformly, preventing local cold spots and moisture accumulation that could cause rust damage.

• **Warm Air Curtain** — In areas where large doors are often opened for truck and freight car loading, door heaters blow warm air downward, producing an air screen that tempers cold air entering the building. The heaters also bring the temperature of the air around the doors back to normal shortly after they are closed.

• **Moisture Removed** — Steam from pipe cleaning and pickling tanks is dissipated by fog eliminators. Fans blow air horizontally through steam heated coils and over the tanks. Moist air is then exhausted through the roof with dyehouse fans.

Similar defogging equipment disposes of steam from the galvanizing tanks.

Moist air is carried away by a hood and blower over the galvanizing furnace.

The Sherritt nickel refinery at Fort Saskatchewan, Alberta, puts chemistry to work recovering nickel from a concentrate by an ammonia pressure leach process.

nickel refining

in a new era of hydrometallurgy

Sherritt's nickel refinery represents a most significant advance in the art of hydrometallurgy. Conventional smelter/electrolytic refinery techniques are replaced by a more efficient and more economical chemical process. The process, developed during four years of intensive pilot plant studies, is unique in its use of low pressure, low temperature ammonia leaching, followed by hydrogen reduction of metallic nickel from the aqueous solution. Three hundred and forty tons of nickel concentrate are processed each day with a yield of 35 tons of nickel, 10 tons of copper residue, and 1000 pounds of cobalt.

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 411S Eighteen West Chelten Building, Philadelphia 44, Pa.

SHERRITT GORDON MINES LIMITED

Teamwork and Standards Patrol Material Costs

EVERY FRIDAY morning, the door closes on a fourth-floor conference room at Warner & Swasey Co., Cleveland. For 2 hours a team of specialists, the production-engineering committee, is in session. Its job is twofold:

First, it scrutinizes drawings for every new product and component to assure a good marriage of product performance and manufacturing feasibility. Second, any troublesome products already in production are reviewed to figure better ways to design or make them.

Pete Rusnov, committee chairman and manager

Warner & Swasey managers confer at a production-engineering committee meeting. They're checking for end product performance and part producibility. Seated left to right are: R. T. Hook, chief metallurgist; Dave Meikle, chief inspector; John Alton, manager of standards department; Jack Lundbeck, assistant manager of the methods department; Art Heidenreich, manager, shop tool design; William Depenbrok, shift superintendent; George Kluter, works engineer; Joe Biley, chief draftsman. Not pictured is Pete Rusnov, manager of the methods department, committee chairman

COST CRISIS . . . How To Beat It

How To Get More From Materials

As materials take an ever bigger portion of total costs, their optimum use becomes the concern of every department. Here are tips that may help you

THE metalworking manager probably has no job more difficult than that of selecting the right material. Yet few jobs can be more important to a company's profit and loss statement.

Materials often account for 25 to 50 per cent of the cost of making a product. They also influence most other manufacturing costs by the way they submit to, or resist, machining, forming, welding, casting, heat treating, and the host of other fabrication methods.

The critical nature of decisions on materials by metalworking man-

of the methods department, figures that most of the recommendations and changes his group makes would be caught sooner or later in the course of production. "But with our approach," he adds, "we catch the troubles in the design stage, long before a year or two of shop trial and error, a host of red tape, and a few thousand dollars has gone down the drain trying to solve what should have been corrected on the drawing board."

• **Materials**—Mr. Rusnov estimates that 5 to 10 per cent of the drawings reviewed by the committee call for some kind of a change in materials to improve part performance, or to ease the production job. The figure is low because the engineers who make the drawings have a list of standard materials to work with, easing their job of selection.

The standards program was started in 1946 by Paul C. Haar, chief standards engineer. Since then, he and Robert T. Hook, chief metallurgist, who is W&S's final authority on materials, have continued to push the program. It has reduced the variety of materials used by W&S and has cut into the number of forms and sizes stocked.

Here, for example, is a summary of the bar stock standard:

Steels To Be Carburized

AISI C 1118 is to be used for parts that are subjected to light working loads or stresses.
AISI 4615 is to be used for parts subjected to moderate stresses or working loads.
AISI 3310 is to be used where working loads or stresses on the parts will be high.

Steels To Be Through Hardened

AISI 4140 is to be used for cross sections up to 2¼ in.
AISI 4150 is to be used for cross sections over 2¼ in.
AISI 4340 is to be used for through hardened parts that require an extra tough core (such as pinions that drive large gears in high tooth-load applications).

Steels To Be Induction Hardened

AISI 1045 is used for parts that require no heat treating and for those that require induction hardening of specific areas for wear resistance.

Those seven steels are used for all but the extra-special jobs at W&S. All specifications for alloys other than those in the standard must first be reviewed and approved by Mr. Hook.

Sizes

In addition to the standardization of alloys, each material has been standardized on bar stock sizes. For example, C 1118 cold-finished round bars can be specified in diameter increments of 1/16 in. up to 2 in., and increments of ⅛ in. to 2⅞ in. Over that size, all C 1118 is hot rolled.

Similar size specifications are written for all bar stock materials.

Results

The seven standard bar stock classifications have replaced 11 that were used for the same jobs. The standardization of bar stock sizes has eliminated more than 400 sizes from inventory.

In addition to the reduction in inventory costs, purchasing costs have been trimmed. Virtually no bar stock material used to be bought in mill lots. Now, at least one-half the bar stock tonnage is bought from the mills in lot sizes, saving from 20 to 40 per cent on those purchases.

agers makes this area one of the key challenges in industry's continuing Cost Crisis.

• **Broad Responsibility**—The wide variety of materials and forms makes selection and supervision of application too big for any one man or department, including purchasing, production, and engineering. Yet all have a role to play. As one company president told STEEL: "The job of getting and using the best material is the job of everyone interested in seeing the company make a profit."

Here are some suggestions on what you should expect the three departments to contribute to material utilization and tips on what you might look for to boost material efficiency in your company.

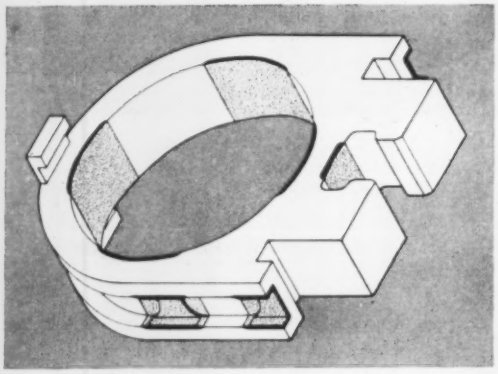
Purchasing

Buyers at Carrier Corp., Syracuse, N. Y., were plagued with rush requests for odd sized sheets that were not in the company's large inventory. It frequently meant that orders had to be placed with warehouses.

A purchasing department suggestion to buy a coil processing line was agreed on. Now sheets are slit and sheared from standard coils. First year savings in scrap and in material costs run to nearly $150,000.

With the approval of both the engineering and production departments, buyers at Lombard Governor Corp., Ashland, Mass., now buy an extruded shape that's processed into the company's sprockets for chain saw drives. The tooth form requires no machining. Hot extrusion and cold drawing give the

Redesign Crops 70 Per Cent off Part Cost



A switch to heat treatable stainless steel helped production men eliminate the difficult job of overlaying the hard surfacing deposits (shaded areas) on these discholders for atomic reactor valves

A NEW material, looser tolerances, and a simpler shape have cut the number of manhours needed to make an atomic reactor component from 110 to 29.62.

Since the most troublesome production operations were eliminated, rejects are down and scheduling is better. The total saving is over 70 per cent of the original cost.

• **The Part**—The discholder that underwent redesign is part of a parallel double disc gate valve that's used to control the flow of water in the primary loops of atomic reactors. The design point is usually 2500 psi at 650° F.

Good surface finishes are musts to preclude accumulation of radioactive deposits in crevices.

By JOHN P. THOREL

Manager, New Apparatus Section
Atomic Equipment Dept.
Westinghouse Electric Corp.
Cheswick, Pa.

• **Old Way**—Type 304 stainless steel was selected for the base material because of its good anticorrosion properties. Overlays of a hard surfacing material were put where mating parts might be subject to undue wear.

Turning out the discholders took 25 production operations. Although plans called for only 80.25 hours on each piece, it was learned that the hard surface overlays were difficult to place and seldom were perfect the first time. Time spent was averaging 110 hours.

• **New Way**—The first step in redesign was to use a hardenable stainless steel (Type 410) to eliminate the pernickety job of hard surfacing. Once this decision was made, a new sequence of operations was worked on until a 14 stage process was accepted by manufacturing.

The new method is timed at 29.62 manhours, including setup. By processing four or eight parts at a time through four of the machining operations, the time it takes to turn out one of the new discholders is 26.75 manhours. Further, tolerances were relaxed, so the parts can be made in an average machine shop with no special skills required.

Here are some direct comparisons of operation times (including setup) before and after:

Milling used to take nearly 33 hours a part, vs. less than 7 hours now.

Grinding used to take about 9 hours; it has been eliminated.

Hard surfacing used to take an allowed 8 hours; heat treating takes only 1 hour, including sandblast.

same tolerances that used to be obtained by milling—and the manufacturing cost is cut 50 per cent.

• **Direct Line**—The purchasing department is the central authority on materials. It is the company's direct line with venders.

The trend is to capitalize on the material information in the purchasing department and to put it to work throughout the manufacturing cycle—the purchasing agent becomes a manager of materials. This can pay off both before materials are specified by the engineer and after the production order goes to the shop.

It did for an instrument builder whose general purchasing agent took a second look at the drawing of a cam for a new machine. The part was a close cousin to a variety of steel extrusions a vender had shown him. The purchasing agent checked with the designer, then the vender. The cams are now being sliced from an extrusion for less than half their original estimated cost.

Such assignments are in addition to the PA's conventional jobs of protecting the company with multiple sources, of buying economical quantities of all products, and of taking advantage of economic changes to get the best possible price.

Production

Manufacturing men at Universal Engineering Co., Frankenmuth, Mich., suggested a tryout of Copperweld's leaded 52100 steel in place of standard 52100 for one of

• **Proving Ground**—The manufacturing line is the final authority on whether material is being used properly.

Production men are expected to spot troubles that can be traced to materials—then ask for a re-evaluation their drill bushings. Result: Machining costs alone dropped 15 per cent, enough to permit an 8 per cent cut in the selling price.

A foreman at one of the country's leading farm machinery builders noted the difficulties in machining a high alloy shaft. He asked the engineers to consider an easier-to-cut alloy, then induction harden the critical wear areas. The idea reduced machining costs by more than 20 per cent and also reduced scrap.

tion. Look for chances to use shaped parts to eliminate machining, materials that can be machined, formed, or fabricated more easily. The sage who said, "we only make money on the portion of the material we ship as a finished product," pinpointed the production department's responsibility to that part of material cost which must be written off as scrap, rework, and inefficient processing.

Engineering

At an industrial machinery maker's plant, 2500 lb pieces of stock were being whittled to 1200 lb parts. An engineer with an antipathy toward large piles of machining chips, found the company could buy the part as a casting, then do only light finish machining. Saved: About $1000 in material costs, an expensive amount of machining.

Robert D. Halverstadt, consultant, Materials Services Dept., General Electric Co., New York, says that: "Above all else, remember that production cost levels are set in the engineering phase, and the design can do more to influence profit and loss than any other single link in the product chain."

One of the industry's oldest, saddest stories is about the number of parts that are overdesigned—the shaft with a tolerance of 0.0001 in. that's slipped into a gear with a bore tolerance of ±0.005. One aircraft production man lamented that with the new materials, every time his engineers cut the tolerance by one-thousandth, he had to add an operation to the manufacturing cycle, and he could count on a 10 per cent increase in scrap rates.

• **Cost Tips**—Here are some suggestions by the experts that can help an engineer keep material costs in line:

Specify dimensional tolerances no closer than necessary for proper performance of the part. Close tolerances add to the number of operations in the shop and increase the scrap rate.

Whenever possible, specify materials that are carried in your company's inventory. A shift to a special adds to purchasing and inventory costs.

When standard materials will lead to excessive manufacturing costs, consider going to special materials or shapes; it may be that the extra costs incurred in the special purchase will be offset by savings in manufacturing.

When a part must be heat treated, give as broad a hardness range as is practical. A broader range may permit batch heat treating of a variety of parts, cutting processing costs.

Setting It Up

In the last ten years the cost of materials used by metalworking has leaped nearly 70 per cent. In addition, emphasis placed on the more efficient use of manpower has resulted in cost cutting in some other areas, but it has increased the share that materials take from the total cost budget. Materials have already become the most important facet of the Cost Crisis in some plants.

Few men are competent to handle a complete program by themselves. Even in the plants like Douglas Aircraft Co., where one executive has the central authority for materials, all departments are expected to share in the responsibility for getting the most out of all materials used.

The team approach is probably the simplest and most effective. One of its big advantages: Policies and decisions become more acceptable to all departments. As one spokesman puts it: "They are not likely to scuttle the boat if they are part of the crew."

Enter the Competition

Your entry may be a winner in STEEL's second annual Cost Crisis Awards Competition. Tell us how your company beat the Cost Crisis through more efficient use of materials.

Four areas are being explored. Your entry may represent one, or a combination of them:

1. The substitution of a tailored shape for standard mill products, or vice versa.
2. The use of a standard purchased material instead of a special, or vice versa.
3. The standardization of two or more separate purchases into one.
4. The substitution of one alloy for another of the same basic material.

The result may be savings in material cost, or in the cost of manufacturing a product.

Write today for your Cost Crisis Awards kit. Address:

The Cost Crisis Editor
STEEL
Penton Bldg.
Cleveland 13, Ohio

PROJECT ALERT AT WORK FOR YOU

FIRST: Udylite introduced its plating barrel reconditioning and replacement plan. It has worked and is working, just as promised, for the many customers who have taken advantage of this service.

SECOND: Udylite offered an unmatchable service for modernizing old rectifiers to give them the benefit of the latest high efficiency rectifier developments.

THIRD: *Now*, Udylite offers a *no charge* technical service for the inspection of your Udylite Full Automatic machines and the recommendation of what is needed to put them in top operating conditions.

THE PLAN AND THE PROMISE:

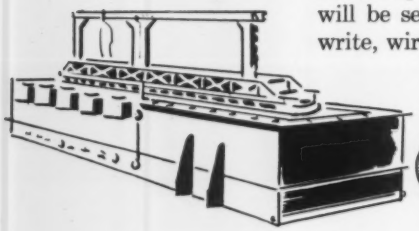
Your Udylite representative will call on you and offer this special service:

1. A factory-trained service man will call at your plant, at your convenience, to determine if your machines need service and/or parts.
2. If they are needed, he will give you, *at that time*, a quotation at the special low prices established for this Project Alert program.
3. On your acceptance of the quotation, parts will be shipped promptly from a special department at Udylite. When they arrive at your plant, the Udylite service man will return and supervise your people in their installation.

THE ADVANTAGES:

1. Complete machine inspection without charge to you.
2. Immediate and complete quotation, if work or parts are needed.
3. Udylite factory supervision in your plant.

All three Project Alert plans are working. And all their advantages are yours for the asking. Your Udylite man will be seeing you soon. But if you need prior service, write, wire or call us *today*.



the **udylite** corporation

detroit 11, michigan • world's largest plating supplier

Old Lathe Modified, Used With Gun Drill

OBSOLETE machines can often be adapted to new applications.

An old lathe is used as a gun drill machine at Canadian Ingersoll-Rand Co., Sherbrooke, Que. Converted at a cost of $3600, it has paid for itself many times in production drilling.

• **Lathes Are Suitable**—The conversion was suggested by engineers of Eldorado Tool & Mfg. Corp., Milford, Conn., a gun drill manufacturer. They said that lathes make suitable gun drill machines because they're rigid, and they operate with a minimum of vibration. They can accommodate fixtures and feed adjusting mechanisms. They can be powered to drive drills at high speeds.

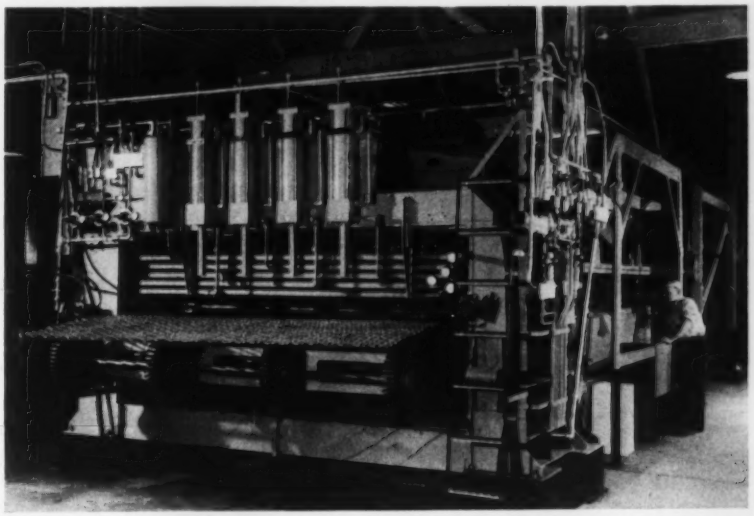
• **Machine Modified**—Bed ways of the lathe were resurfaced. A feed system was installed, linking the drill spindle and the lathe gearbox. It permits feeds of 0.0002 to 0.002 in. per revolution. Because slow feed was desired, Ingersoll-Rand engineers substituted a worm drive for the original gear train.

In most gun drill setups, either the drill or the work can be rotated. Drill rotation was chosen because most work was to be done on irregular shapes.

The direct current variable motor has a rheostat control and a tachometer to indicate revolutions per minute. Hole depth is controlled by an air valve, mounted on the lathe carriage. When the valve contacts a stop block on the bed ways, drilling is stopped.

• **Lubrication System**—Coolant is forced through the rotating spindle, and down to the drill tip, by a Sealol fluid transfer. The Vickers vane pump, driven by a 10 hp motor, supplies 40 gallons of oil a minute.

A centrifugal pump forces used oil through a filter and heat exchanger, then back into the clean oil tank. The right oil pressure is maintained by a relief valve, with a high pressure gage mounted on the control panel. A low pressure gage warns when oil filters are clogged.



This device forms and welds 10 tons of hot-rolled steel into more than 5000 sq ft of gratings in 8 hours. Its personnel requirements: One maintenance man

Grating Making Is Automated

Special machine notches steel bars, forms, and welds them into various sized floor sections. It formerly required 24 men to do the same operations

A NEW assembly and welding machine automatically turns out 5000 sq ft of industrial floor grating in 8 hours at Bustin Steel Products Inc., Dover, N. J.

The job formerly required 24 people; now only a maintenance man is needed. President Leo Bustin, who designed the machine, says the product is of higher quality. He thinks savings will eventually enable him to reduce its price.

• **Development** — The machine took seven years to develop. Mr. Bustin started with a scale model to develop feeding and indexing mechanisms.

The problem of getting the right kind of steel was solved with the help of Sharon Steel Corp., Sharon, Pa., which developed a hot-rolled bar. Delicate adjustments required a high degree of uniformity in the metallurgical structure. It is particularly vital in preforming to minimize metal fatigue.

• **Characteristics**—The grating is a nonslip design and has no side bars. Half inch steel 10½ ft long is first cleaned in a Pangborn shot cleaning unit, then rapidly notched. A gravity feeder accepts the notched bars and feeds them to the automatic machine.

Conveyor chains pick up the bars and place them in forming dies which can be changed to produce several patterns.

• **Joining** — Bars are resistance welded by a 14 ton, multiple spindle machine. The firing sequence is adjustable. It welds the full height of the bar at formed contact points. As soon as one bar is welded, another falls automatically into place.

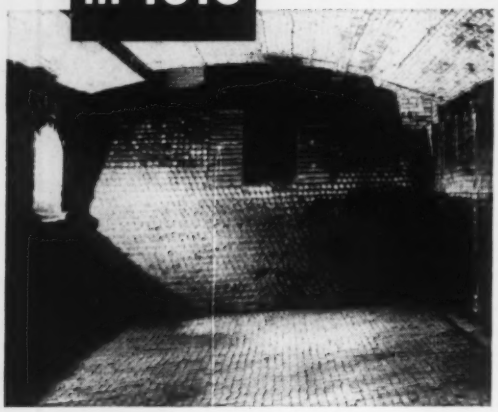
Theoretically, any length could be produced, but widths are held to 48 in. or less.

After painting and drying, the grating is ready for shipment. Two more machines are being built. Mr. Bustin says he will shortly be making stainless steel gratings for chemical and food producers.

HARBISON-WALKER HISTORY OF PROGRESS IN REFRACTORIES FOR THE ALL-BASIC OPEN HEARTH FURNACE

Harbison-Walker Refractories Company from its first beginnings, in 1865, only several years short of a century ago, has closely worked with the iron and steel industries in the production of refractories needed to make possible the rapid evolutionary advances in furnace practice. This progress involves increased severity of operating conditions including much higher temperatures and larger furnaces with increased rates of production, accompanied by the use of oxygen with all its benefits. Rates of steel production based on sizes and designs of furnaces — noteworthy advances in metallurgical practice — and availability of superior refractories, in many instances, have been substantially increased.

in 1916



in 1931

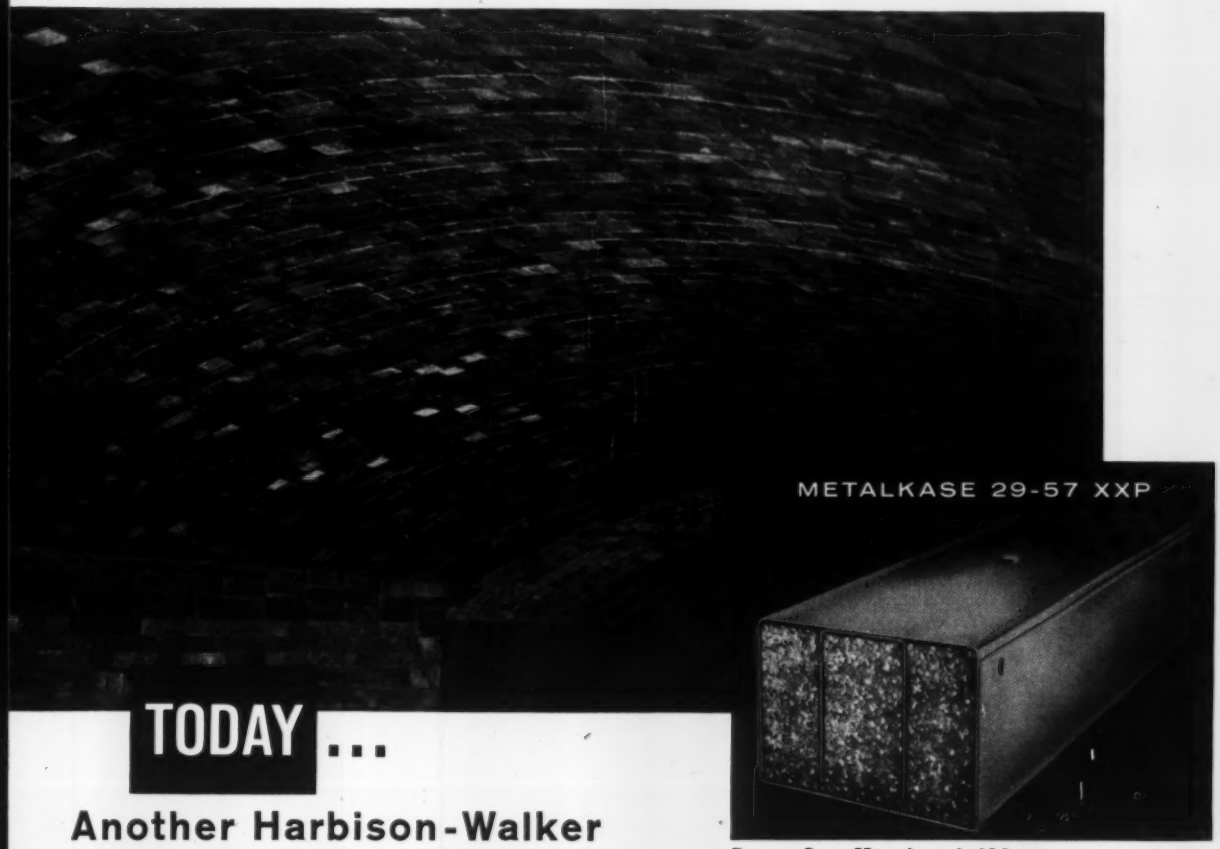
QUOTATIONS FROM LITERATURE OF LONG AGO ILLUSTRATE HARBISON-WALKER'S LEADERSHIP

The Original METALKASE Basic Brick. From Harbison-Walker Manual 1916: "METALKASE BRICK, a refractory of ingenious form, developed and perfected through several years' service in actual open hearth practice. After its value in open hearth linings had been completely demonstrated, it was first placed on the market in 1916. These brick have been adopted with highly satisfactory results in many steel plants and under conditions for which they are best suited have given two to three times the service of magnesite brick and many times that of silica brick."

The First Suspended Basic Roof built for Harbison-Walker's pioneering research in 1931. From AIME Proceedings, Volume 106 (1933): "Almost nothing was known regarding the behavior of magnesite brick in suspended construction; the time required for safe heating and cooling, limiting temperatures at which hot patching could be attempted; the effects of relatively high thermal conductivity on hangers; probable heat losses; or the possibility of insulation. In order to secure needed data, an experiment was conducted at the plant of Harbison-Walker Refractories Company at Hays, Pa."

in 1923 . . . Chemically Bonded Basic Brick — In the year 1923 Harbison-Walker introduced the first chemically bonded magnesite-chrome refractory for which patents were granted in 1925. Through ensuing years, many millions of chemically bonded basic brick, a major portion of which were made with the metal casings, have become used as the standard type of basic brick in open hearth steel furnaces.

These important milestones of progress in basic refractories are typical of many others by Harbison-Walker.



Sprung Open Hearth roof of METALKASE 29-57 XXP at Homestead Works of United States Steel Corporation.

TODAY ...

Another Harbison-Walker Basic Open Hearth Roof among the many making service and tonnage records

With the all-basic open hearth furnace becoming an economical reality the production of new refractories having decidedly enhanced properties has been necessary. Harbison-Walker conventional and specialized basic refractories are fully meeting these requirements.

A fundamental factor in the achievement of the all-basic furnace is the metal encased basic brick pioneered more than forty years ago by Harbison-Walker. Through constant research and extensive application experience, rapid evolutionary progress has resulted in the successful use of the metal encased brick for the open hearth roofs as well as for other furnace parts. METALKASE 29-57 XXP internally plated metal encased brick are used in both sprung and suspended open hearth roof constructions of all designs with excellent service records.

An exceedingly important contributor to the excellence of this refractory developed specifically for this requirement, is the high purity magnesia produced by Harbison-Walker from Michigan brines. Fully stabilized as periclase of high density, it is an important constituent of this refractory having outstanding properties for the particular application.

The successful use of basic brick for roofs contributes to greater severity of conditions imposed upon other furnace parts. Harbison-Walker basic refractory products long established with unequalled records, together with the newer specialized brands, fulfill these rigid requirements for bottoms — walls — and regenerator checkers and make the ALL-INCLUSIVE, ALL-BASIC Open Hearth Steel Furnace a reality.

HARBISON-WALKER REFRACTORIES CO.

and Subsidiaries

General Offices: Pittsburgh, Pennsylvania

World's Most Complete Refractories Service

L-D PROCESS
BASIC OXYGEN PROCESS
OXYGEN STEELMAKING

Which is which—How do they differ?

In the rapidly broadening use of oxygen in steelmaking, various names have been applied to differing, and even the same, oxygen steel processes.

To clarify terminology, the American Iron and Steel Institute has recommended the designation BASIC OXYGEN PROCESS as the generic term for any basic steelmaking process wherein oxygen gas above atmospheric concentration is a dominant factor. The American Iron and Steel Institute defines it: "The term basic oxygen steel is used to define a steel which is considered to be the equivalent of basic open hearth steel and whose residual nitrogen content is not in excess of [illegible] per cent."

Specifications writing societies including the American Society for Testing Materials and the American Petroleum Institute have applied the same terminology. The American Bureau of Shipping has also used the same general terminology with certain additional qualifications.

L-D Process Explained

The L-D PROCESS (so called [illegible] Engineers is the synthesis [illegible] process [illegible] [illegible] [illegible]

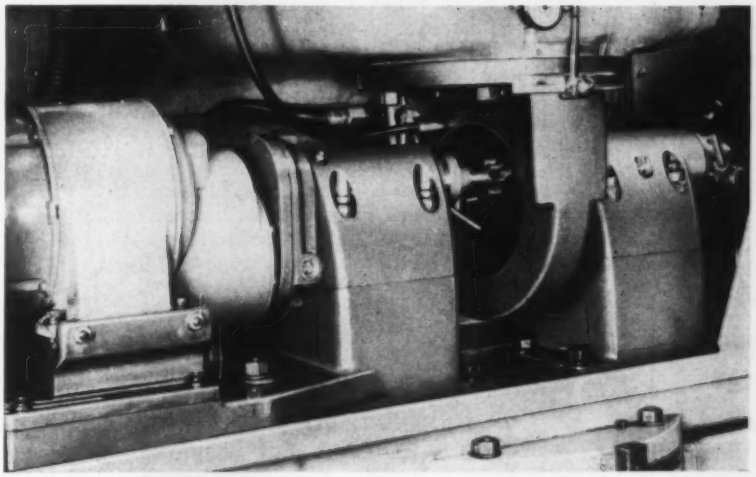
Machine Shaves Gears with Small Number of Teeth

ACCURATE control of surface finish, profile, and lead on gears having 12 or less teeth is possible with the Red Ring rotary gear shaver.

It utilizes a precision rotary cutter made in the form of an internal helical gear. The enveloping action of the cutter increases surface contact between the cutter and work gear profile. The manufacturer says the process produces smoother, more accurate tooth profiles on gears with small numbers of teeth than the method of meshing a gear and cutter externally.

The new process requires a different drive arrangement: The work drives the cutter instead of the other way around, as on conventional rotary gear shaving machines.

In operation, the work gear is rotated while being traversed back and forth in mesh with the cutter. The gear is fed upward until proper tooth size is reached.



For more information, *write* National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

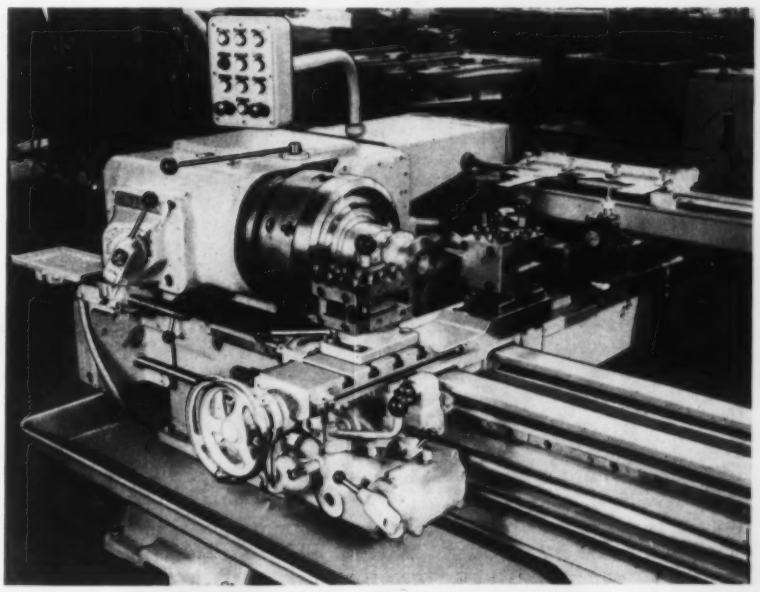
This Turret Lathe Tracer Has Four Cycles

FOUR automatically controlled tracing cycles are possible with this new hydraulically controlled Jones & Lamson carriage tracer.

It will trace through 180 degrees of tool travel while turning, with the feed toward or away from the headstock. It also will trace through 180 degrees of tool travel while facing, with feed toward or away from the spindle center line.

Roughing or finishing tracing tools can be used from the square indexing turret. Complete size control for diameter is accomplished with the conventional handwheel. The unit also can be used as a taper attachment, and, with a suitable threading device, will produce tapered threads.

Mounted on the rear of the cross slide carriage, the tracer does not interfere with normal operation of



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L-D Process Explained

The L-D PROCESS, for which Kaiser Engineers is the exclusive U.S. licensor, is one of these BASIC OXYGEN PROCESSES and the one in widest use today. Of approximately 70 furnaces operating or building within this classification, 62 are the L-D PROCESS type.

(The remaining 8 are rotating vessel processes which should not be confused with the L-D PROCESS.)

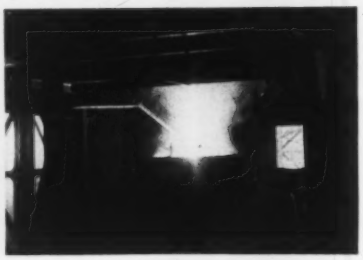
L-D PROCESS is the generally accepted designation of the process where molten pig iron and scrap is subjected to high purity oxygen blown vertically onto its surface in an upright furnace.

L-D PROCESS in action

Charging molten iron

Charging scrap

Blowing



Tapping

L-D Process Advantages

Reasons for world-wide preference of the L-D PROCESS include faster production, better product quality, adaptability to a variety of hot metal analyses, and the low capital investment of about $13 to $15 per annual ingot ton vs. $18 for electric furnaces and $33 for open-hearths.

The L-D PROCESS has also been termed "Linz-Donau" (Linz on the Danube), "Linz-Donawitz," location of the two originating steel plants in Austria and "Linzer Dusenverfahren" which has been interpreted as "Linz Jet Process." Actually, no special significance is attached today in the U. S. to the letters "L-D" other than the fact that they specifically identify, in every part of the world, the generally preferred process for adding new steelmaking facilities.

Complete Steel Plant by KE

Kaiser Engineers designs and builds complete L-D PROCESS installations; also designs and builds complete steel plants including blast furnaces, open-hearth and electric furnace installations, sinter plants, rolling mills, pipe mills, by-products plants, ore beneficiation, air pollution control and water treatment facilities.

For complete new-plant or expansion service, from process design to start-up day, KE offers experience coupled with traditional Kaiser ingenuity. The L-D PROCESS is an example of KE's capability in the application of new developments to the steel industry.

For full information on L-D PROCESS or other KE services in steel plant design and construction, call or write KE at:

Pittsburgh, 330 Grant St., AT 1-7992
New York, 300 Park Ave., PL 9-1100
Oakland, 1924 Broadway, CR 1-2211

KAISER ENGINEERS **KAISER ENGINEERS** engineers-contractors
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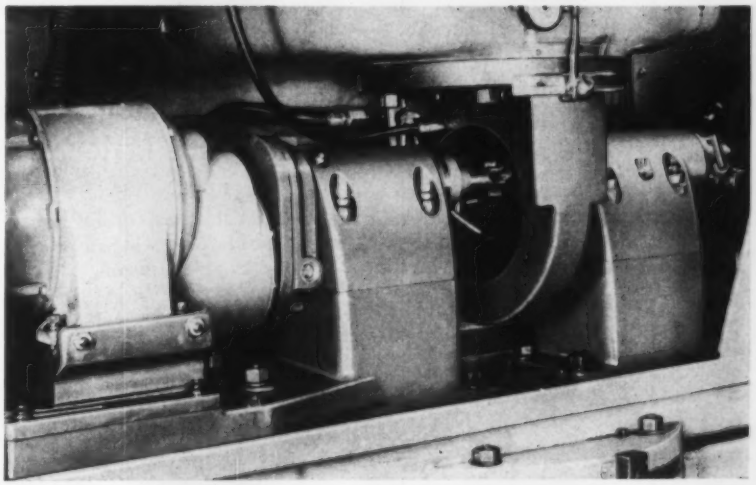

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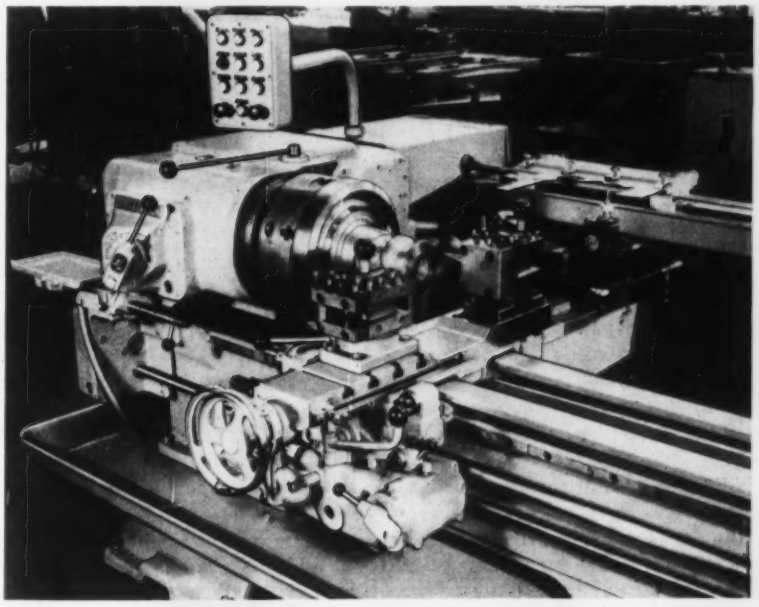


the square turret, the hexagon turret, or with tooling positioned at the rear of the cross slide. Templates and stylus are always in view of the operator and are clear and free from chips and coolant.

For more information, *write* Jones & Lamson Machine Co., Springfield, Vt.

Unit Handles Acid Fumes

FUME problems in continuous or batch pickling systems can be solved with a package ventilating unit that includes a scrubber, a transition section, and a fan. The unit will handle sulfuric, hydrochloric, and low concentrate nitric acid fumes.

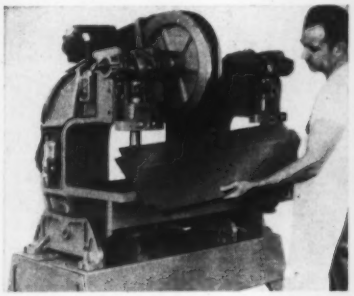
All parts of the scrubber and fan exposed to the air stream are lined with neoprene. The scrubber is made of extruded polyvinyl chloride (PVC) impingement baffles. Piping and spray nozzles are rigid PVC.

For more information, *write* Robinson Ventilating Co., 252 Henderson St., Zelienople, Pa.

Double Ram Punch Press Handles Wide Materials

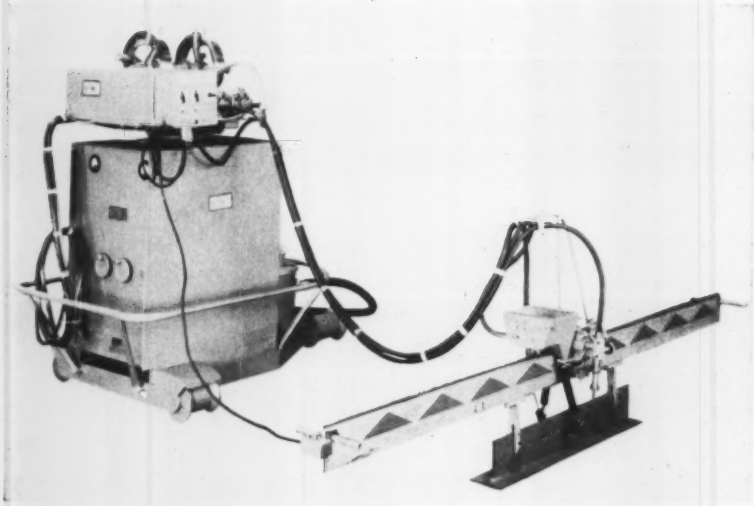
THE KENCO Mark II-C will do the work of heavier, costlier presses usually needed for wide areas.

It consists of two 5-ton, 12¾ in. deep throat presses that permit punching to the center of 25 in. wide material up to 60 in. long.



The new Kenco Cyclo-Safe roller clutch permits a central drive between the two presses, eliminating torsional twist to the crankshaft, and allowing synchronization of the rams and even distribution of power.

The clutch can be operated manually or electrically. For more information, *write* Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles 22, Calif.



Welding Carriage Eliminates Handwork

THIS twin fillet machine carriage lets you automatically weld stiffeners, flanges, and other structural components from corner to corner. It eliminates costly manual welding, required when using conventional machine carriages.

Dual automatic wire feeds are featured on the heavy duty aluminum carriage and power supply. Result: Flexibility and ease of handling for a variety of structural fabrication applications. Units are available for submerged or inert arc, and other consumable welding processes.

Travel speed is controlled by an electronic governor and will not vary under load. Standard speed range is 1 to 60 ipm (higher speeds are optional).

A central operator station is mounted on the welding carriage. It provides maximum efficiency and ease of operation.

For more information, *write* L & B Welding Equipment Inc., 2424 Sixth St., Berkeley, Calif.

Balances Rotating Parts

DESIGNED for ease of use by unskilled operators in production line balancing of rotating parts, the five new Bear Bekomatic Balancers are capable of indicating unbalance vibration to 20 millionths of an inch.

Three horizontal machines and two vertical machines will handle workpieces from 1 ounce to 400 lb with up to 36 in. swing.

Magnitudes of unbalance are shown by a large meter directly in front of the operator. The meter is calibrated for direct reading in terms of correction procedure.

For more information, *write* Bear Mfg. Co., Rock Island, Ill.

Plastic Material Does Variety of Repair Jobs

VIRTUALLY any industrial repair job can be done with an epoxy-polyamide compound known as Plastic Mastic, says the manufacturer.

It has proved practical for repairing floors, walls, ceilings, masonry, machinery, fixtures, tanks, pipes, and for filling breaks, holes, and cracks. The repair material can be used on concrete, metals,

NEW! ULTRA-MODERN 45-TON OBI

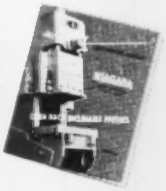
added to Niagara's exclusive front-to-back crankshaft series

READY FOR YOU

. . . a brand new addition to industry's most advanced line of OBI's! Years ahead of any press within its range, this 45-ton newcomer is available plain or geared. The front-to-back arrangement of its 3½" crankshaft is, of course, a distinguishing mark of Niagara's famous Series E.

No other OBI press design has been so widely acclaimed. And no wonder . . . for no other OBI boasts so many unique advantages:

Full support to wide dies. Greater resistance to off-center loading. Accurate alignment of slide with minimized tendency to cock. Crankshaft deflection minimized. Substantially increased die life. Smoother, safer performance. Exposed overhanging gears, flywheel and other mechanisms eliminated. Less floor space.



GET THE FULL STORY on this new 45-ton wonder-worker as well as the 4 other sizes in the Series E family (up thru 200-ton capacities, and 7½" shaft diameters, standard and automated models). Write for illustrated Bulletin 56.

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N. Y.

- Rigid crankshaft with close coupled main bearings each side of crank pin.
- Widest spaced OBI gibbing (L to R) in the industry permits wider box section slide to rigidly support a greater slide face area of full JIC dimensions. Guiding of slide is closer to point of die operation because there is no flange interference with gibbing.
- Longest gibbing in the industry, exclusive multiple "V" type, provides the most efficient guiding and accurate alignment of slide for greatest die life.
- Fully concealed, yet readily accessible, driving mechanism.
- Enclosed, rigidly supported gearing operates in sealed oil bath.
- Low inertia, pneumatic friction clutch and brake operate directly on crankshaft — the slowest rotating shaft.
- Precision, hardened, longer-wearing steel gears.
- Rigid, compact all-steel, box type frame.
- Power slide adjustment and power inclining device operate with new, unequaled speed.

NIAGARA

OBI PRESSES SERIES E

DISTRICT OFFICES: Boston • Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia / Distributors in principal U.S. cities and major foreign countries.

wood, ceramics, glass, rubber, cloth, paper products, and most plastics.

The material is ready for application when a white epoxy resin base and a black polyamide hardener are mixed until they become neutral gray. At room temperature, cured Plastic Mastic is hard to the touch in 4 hours, can be walked on in 8 hours.

For more information, *write* Williamson Adhesives Inc., 8220 Kimball Ave., Skokie, Ill.

Tool Detector Cuts Transfer Machine Cost

FOR use on transfer machines, a tool detector eliminates separate probe and inspection heads, prevents processing of scrap parts, and prevents additional tool breakage.

The electronic device detects the presence or absence of a tool, or even a part of a tool in cases where a small piece of drill or tap breaks off and remains in the workpiece. Mounted on bushing plates behind the regular drill bushing hole, the unit detects the tool as it passes through the bushing before or after machining.

Elimination of probe and inspection heads reduces over-all machine size and floor space requirements. Greatest saving potential is in eliminating processing of scrapped parts. When a tool breaks, the device shuts down the machine.

For more information, *write* Cross Co., 17801 14-Mile Rd., Detroit, Mich.

Crane and Hoist Drive Adjusts Speed to Load

OPTIMUM lifting speed is assured with the V-S crane and hoist drive because it adjusts automatically to weight on the lift hook.

The drive uses all of the available horsepower of the motor over the entire speed range, giving maximum hoisting speeds under normal loads, and safe speeds for heavy loads.

Smooth acceleration and deceleration are provided for hoisting and lowering. It is impossible for the operator to unintentionally reverse the drive. Smooth performance virtually eliminates shock loads to the mechanical equipment, reduces crane maintenance, and provides easier, more precise load positioning.

For more information, *write* Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Hand Shear Has Higher Mechanical Advantage

A COMBINATION eccentric-leverage operation on the Di-Acro 36 in., hand operated shear provides greater mechanical advantage than is possible with a shear operated by leverage only.

An inclined ram permits setting of the shear blades at an angle so that only the blade edge is in contact with the material, thus reducing shearing force or pressure. Up to 16 gage mild steel can be cut across the 36 in. width.

The inclined ram also helps to counteract thrust and keep shear blades straight. Ram eccentrics are mounted back from the center line to hold the ram against guides. A downward and backward pull keeps the ram housing against the guides and allows an accurate blade clearance with die accuracy in shearing.

For more information, *write* O'Neil-Irwin Mfg. Co., 619 Eighth Ave., Lake City, Minn.

System Monitors Bearing And Process Temperatures

THE FENWAL continuous, multipoint, temperature monitoring system detects and gives warning when the temperature at any protected point reaches a preselected high or low limit.

It can be used to monitor bearing temperature in generators, turbines, pumps, and other rotating equipment, as well as temperatures in processes and processing equipment.

An outstanding advantage of the system is its ability to monitor all points continuously. The sensing circuits employ no sampling or scanning devices. They are terminated in a multiple channel bridge network which receives all inputs simultaneously.

Eliminating the need for scanning devices simplifies and increases the reliability of the system. It also insures instantaneous response to an abnormal condition at any point, regardless of the total number of points in the system.

For more information, *write* Fenwal Inc., Ashland, Mass.

Liquid Detergent Cleans Buffed Parts

HARDENED buffing and polishing compounds can be removed rapidly from most metals with a liquid detergent called Enthol 230. It penetrates and dissolves the compounds, forming soluble soaps which can be easily washed off.

The detergent is effective for ultrasonic cleaning. It causes cavitation to be produced at a lower energy level than other cleaning solutions, says the manufacturer. Improving the cavitation pattern brings a corresponding rise in cleaning efficiency.

The solution will last four to six weeks in production without replenishment. It has a brightening effect on copper and copper alloys.

For more information, *write* Enthone Inc., subsidiary of American Smelting & Refining Co., New Haven, Conn.

Ultrasonic Impact Drill Has Automatic Tuning

AN AUTOMATIC tuning control system frees the operator from constant readjustments when using the Glennite 100 watt impact drill. The instrument drills, slices, engraves, shapes, taps, broaches, dices, shaves, trepans, and machines.

Adaptable for shaping of intricate

UNIFORM QUALITY of KEYSTONE WIRE means UNIFORM STAPLES for SPOTNAILS, INC.

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Keystone representatives work with Spotnails designers to produce wire with just the right qualities for mass production and perfect performance. This close, confidential cooperation is available to you, too. Tell us your wire forming problem—we'll help you solve it!

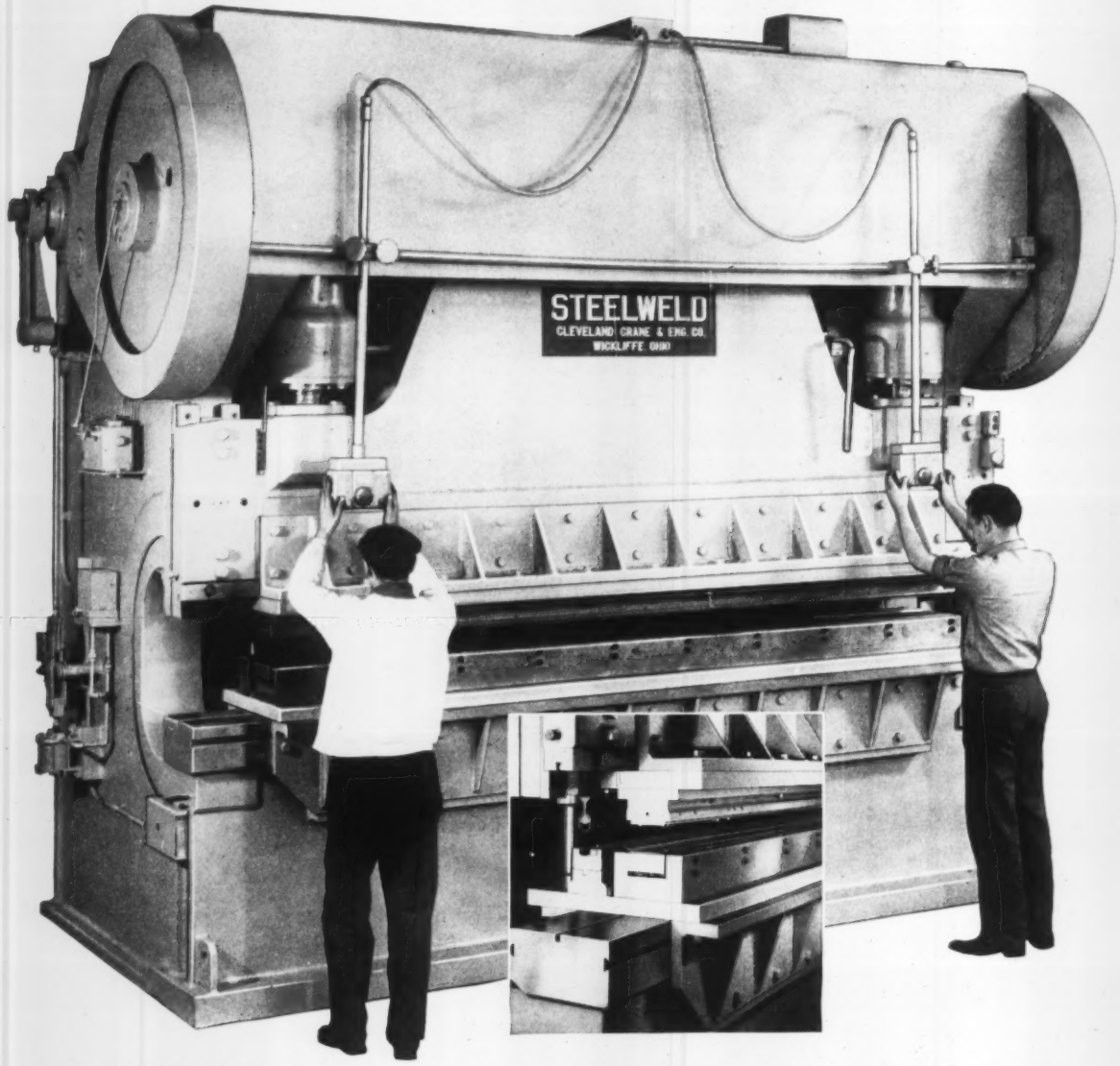
Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

STEELWELD PRESS BRAKE CUTS FORMING COSTS

Fast Two-Step Operation Speeds Trolley Duct Production



ELECTRIC trolley duct is turned out at a high rate on a Model K5-10 Steelweld Brake. The machine is fitted with removable bed and ram brackets to provide the width necessary to support two sets of dies. The front dies flange both sides of steel strips. The rear dies form the flanged strips into ducts. Thus, with each stroke of the ram, two operations are performed and a trolley duct completed. As many as 20 ducts can be produced per minute, which is the speed of the machine.

Two men normally work at the press, and each is provided with a set of control buttons. As a safety measure, two "run" buttons, requiring both hands of the two men, must be depressed to operate the machine.

This machine has air-electric control which eliminates the need of any cross shafting at front for mechanical foot treadles. Air-electric control makes push-button operation possible and provides fast, positive clutch and brake action.

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Mechanical and Hydraulic

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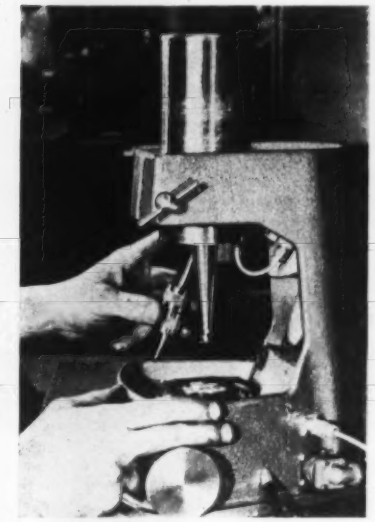


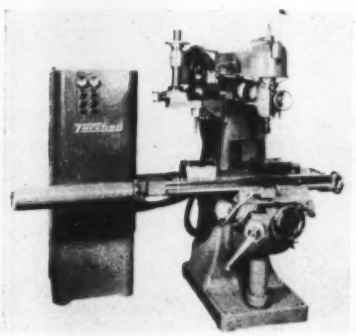
parts to precision tolerances, the unit ultrasonically machines such materials as ceramics, glass, silicon, germanium, tungsten, granite, ferrite, tungsten carbide, quartz, precious stones, and aluminum oxide.

For more information, *write* Vibro-Ceramics Div., Gulton Industries Inc., 212 Durham Ave., Metuchen, N. J.

Automatic Diesinker Contours Full Circle

PRECISION machining of contours with complex shapes and vertical interior or exterior walls can be done on the Turchan Recipro-Matic. A single switch changes the automatic diesinker to a 360 degree contouring machine.

As a diesinker, the system combines automatic feed rate control, reciprocation, depth control, and in-



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Automatically by.....
The operation of this 110-inch Reversing Slabbing Mill is controlled by ECaM's Punched Card Automatic Positioning Screwdown Control System

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
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EC&M PUNCHED CARD CONTROL

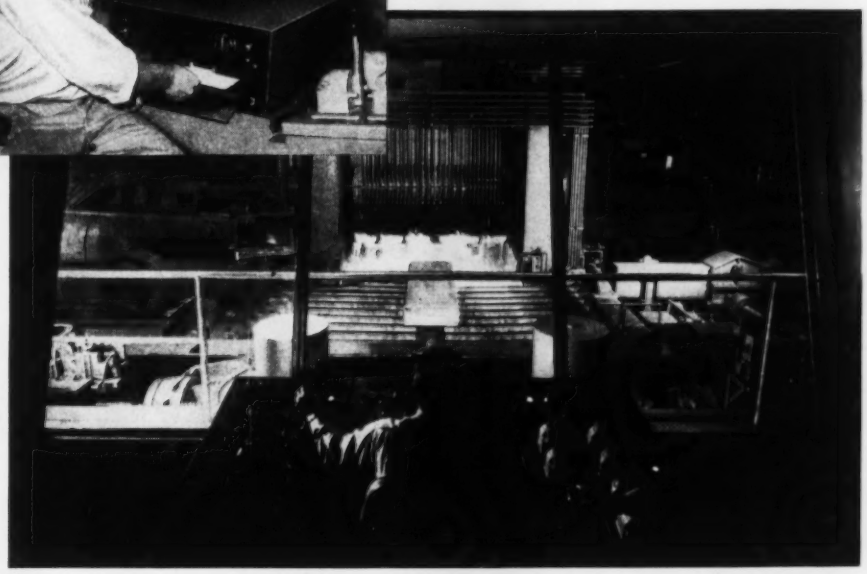
Since 1937, EC&M has been the pioneer in the development of Automatic Positioning Screwdown Control Systems. With EC&M's Punched Card System of scheduling, new operators can be quickly trained to produce greater tonnage to accurate tolerances—automatically. Since rolling is automatically maintained to specifications issued by the Metallurgical Department, the highest quality of the finished product is assured.

With EC&M's Punched Card System of automatic rolling, the operator can easily change from automatic to manual control and back again. To change schedules, a new card is inserted in the card reader. Cards can be stored and re-used when an identical rolling schedule is needed.

The EC&M Automatic Positioning Screwdown Control System can be furnished with Direct Reading Card System, IBM Card System or Slider Type Schedule Panel.

Write for Bulletin 6550 for complete information

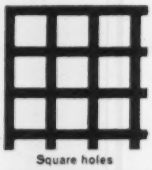
A single card containing the schedule for all passes is easily inserted in the Card Reader. With the card in place, the operator, by pressing a single pushbutton once for each pass, positions the rolls accurately. There is no schedule to memorize.

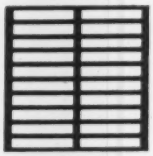


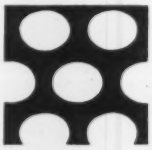
This 168-inch Reversing Roughing Mill is also equipped with EC&M's Punched Card Automatic Positioning Screwdown Control System

H&K PERFORATED MATERIALS

for Industrial or Decorative Uses


Square holes


Slots


Oval holes

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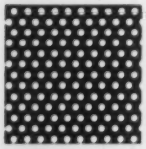
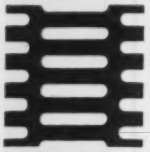
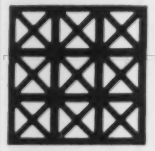

Round holes


Oblong holes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H & K facilities enable the perforating of all metals, wood, plastics and cloth fabrics. Perforated materials can be furnished in sheets, coils, rolls or plates. Fabricating services include shearing, rolling, welding and forming.

Perforated metal can be ordered with special finishes: aluminum—color anodized or brushed and lacquer finish; steel—painted, chrome plated, enameled, japanned or other baked-on finish. Decorative patterns can be embossed if requested.

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For more information, *write* Turchan Follower Machine Co., P. O. Box 657, Inkster, Mich.

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YOU CAN cut an hour off x-ray film processing time with the Kodak X-Omat Processor. It will expedite shipment of finished products which must await approval by x-ray inspection before being sent out.

The system is completely automated. Exposed film is fed between rollers at one end of the processor and dry radiographs are turned out 13 minutes later.

Most standard sizes of Type AA and Type M sheet and roll industrial film may be handled without adjusting the system. Fed three at a time, 4½ x 10 in. films can be processed at a rate of about 560 sheets an hour. Large 14 x 17 in. radiographs will go through the processor at a speed of about 140 sheets an hour.

For more information, *write* X-Ray Div., Eastman Kodak Co., Rochester 4, N. Y.

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Cut Master V.T.L., Model 75

Extreme accuracy is mandatory for a number of machining jobs at the Fuller Company, Manheim, Pa. For example, according to Mr. M. L. Strayer, Machine Shop Supt. "the largest volume piece we process on our Cut Master, Model 75, is the facing of seats for cement diverting valves. They must be perfectly flat. This critical operation is done so accurately on the Bullard Cut Master, Model 75, that with a little hand lapping we have an airtight joint."

This machine has a 24" extra high bed, speed range 6.8 to 250.0 R.P.M. Equipped with 5 sided Turret Head and 4 sided Side Head, both hand indexing, 4 jaw hand operated chuck.

This "built-in" accuracy, which is inherent in every Bullard Cut Master V.T.L., Model 75, can be applied to your work.

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"moving sidewalk" conveyor eliminates plant congestion

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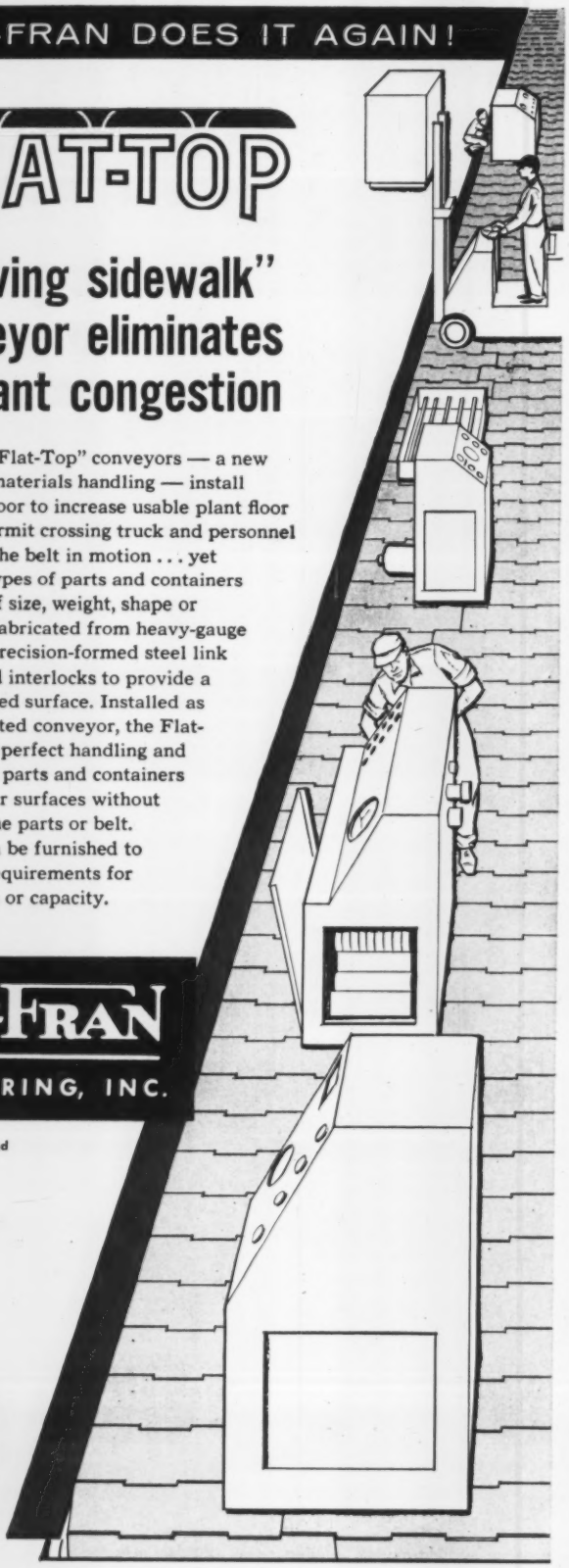

MAY-FRAN ENGINEERING, INC.

1725 Clarkstone Road
Cleveland 12, Ohio

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FOR CATALOG MF-100

8322-MF

NEW Literature

Write directly to the company for a copy

For Engineers and Designers

"Better Products for Automation Through Standardization," 32 pages, outlines the adaptability of standardized precision gears and allied components to a wide variety of design requirements. PIC Design Corp., 477 Atlantic Ave., East Rockaway, N. Y.

Alloy Chart

An alloy chart (Bulletin 157) shows comparative specifications, chemical analyses, and the minimum physical properties of nonferrous alloys. Centrifugally Cast Products Div., Shenango Furnace Co., Dover, Ohio.

Rust Prevention

A brochure describes Permox 1-4-3, a basic lead silico chromate pigment. Anticorrosive, it can be used to formulate primers, intermediate and finish coats. Each coat provides maximum rust inhibition. Advertising Dept., Eagle-Picher Co., American Bldg., Cincinnati 1, Ohio.

Stainless Use in Architecture

"Architecture and Allegheny Stainless," 50 pages, presents dozens of ideas for building uses. Curtain wall design is included. One section of the booklet shows compatibility of stainless with other materials. Advertising Dept., Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.

Welding Equipment Data

A 24-page brochure discusses 50 design features found in oxyacetylene welding and cutting equipment and industrial regulators produced by 19 manufacturers. Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.

Bending of Thin Wall Tubes

A booklet gives information on bending machines for critical bending of thin wall, high strength alloy tubes for applications in missile and jet plane work. Wallace Supplies Mfg. Co., 1300 Diversey Parkway, Chicago 14, Ill.

Motor Application Guide

Polyphase, single phase, and direct current motor selection charts describe typical motor driven equipment, show starting and running torques, load characteristics, and type of motor to use. Form 270-A. Century Electric Co., 18th and Pine Streets, St. Louis 3, Mo.

Expansion Joints, Couplings

Rubber, neoprene, and Teflon-lined expansion joints, their construction, sizes, and uses are explained in Bulletin AD-137. Garlock Packing Co., 433 Main St., Palmyra, N. Y.

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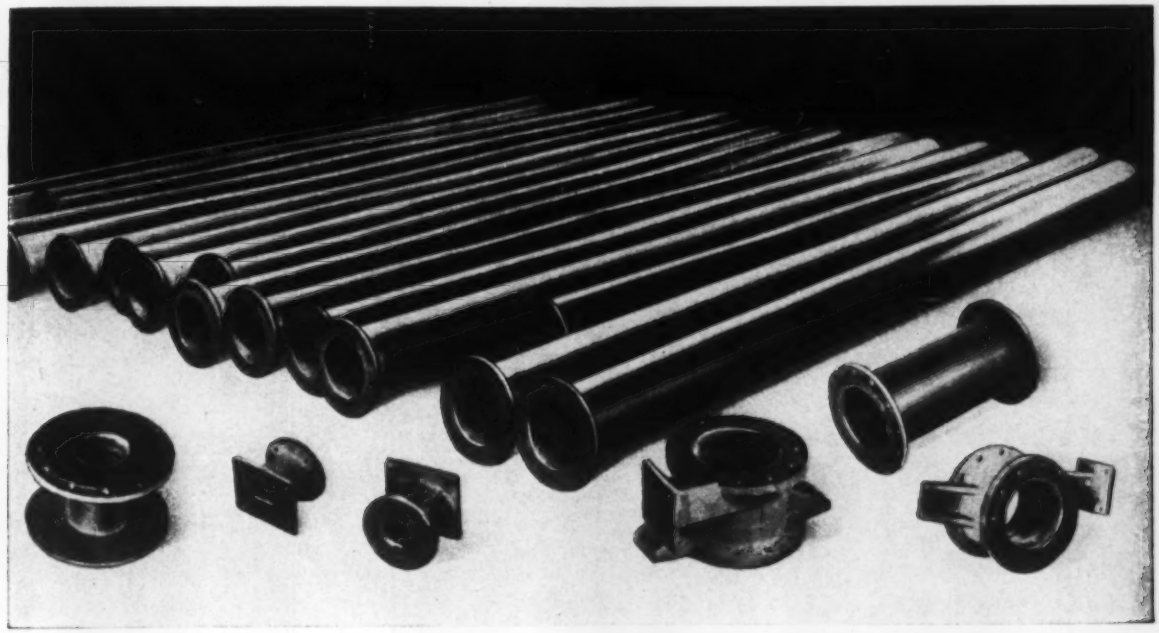
REG. U. S. PAT. OFFICE

COATED IRON PIPES AND FITTINGS PROTECT YOUR PRODUCTS



Many industries rely on HERESITE PURE PHENOL-FORMALDEHYDE resin lining in steel pipes and steel pipe fittings to control corrosion and commodity contamination.

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Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

March 30, 1959

Complaints Few Despite Allocations

ALLOCATIONS are never popular when steel's in tight supply, but they are causing remarkably little friction among buyers and sellers this year. Steelmakers probably deserve more credit for their handling of orders than for the production records they've set.

Without mentioning the hateful word "allocation," mills have asked buyers not to order tonnages much in excess of their customary requirements. "Customers aren't pressing us for more than we offer," a sales executive comments.

BUYING RUSH ABATES— Orders are coming in at a trickle instead of a torrent, but consumers aren't backing down on their commitments. Some would take additional tonnage if they could get it. Others insist that they won't build their inventories if they have to borrow. Reasons: 1. Interest charges might offset whatever they could gain by buying ahead of a price increase. 2. Handling costs mount when warehouses and work areas are overcrowded.

SHEETS SOLD OUT— Most sheet mills are booked solid for the first half. One producer has refused more than 60,000 tons of flat-rolled business in the last few weeks. Some have had to close their books earlier than anticipated.

Case in point: A company that set up a "division output" plan in January and asked its sales offices to submit minimum and maximum estimates of customers' first half requirements. Salesmen were told that they could order any tonnage within the minimum-maximum range so long as they allowed 45 days' leadtime. But the mill soon discovered that it had overestimated its ability to produce. It had to cut off orders for June delivery at the end of February.

PLATES IN STRONG DEMAND— Eastern plate mills will probably get more business in the remainder of the first half than they can handle. Booked solidly through June (on the basis of set-asides as well as orders), they're making entries for the third quarter. Railroad carbuilders are pressing for delivery of everything they've ordered before July 1.

TUBULAR OUTLOOK BRIGHT— Producers of oil country goods are pretty well loaded at the mill level, but they still have inventories for sale in the Southwest. Downriver stocks are being sold faster than they're being replaced, however, and some companies estimate that their warehouses will be exhausted by May. If there's no strike, replacement of downriver inventories will keep the mills fairly busy in third quarter.

SEAWAY THREATENS— Already alarmed by foreign steelmakers' sales in the U. S., American mills fear even stiffer competition when the St. Lawrence Seaway opens. Here's why: Using foreign steel, a Detroit service center underbid a big U. S. mill on 200,000 tons of bars and structurals for municipal projects in the Detroit area.

OUTPUT UNCHANGED— Last week, steelmakers operated their furnaces at 93 per cent of capacity. Production was about 2,633,000 net tons of steel for ingots and castings. STEEL's composite price on the prime grade of scrap fell from $41.67 to $39.33 a ton.

WHERE TO FIND MARKETS & PRICES

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*Current prices were published in the Mar. 9 issue and will appear in subsequent issues.

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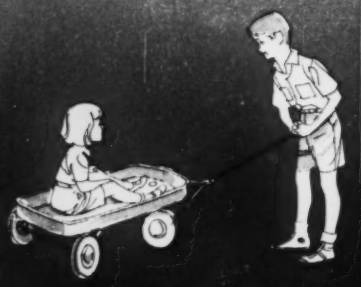
in customer service

helps cut production costs



At Alan Wood, VERSATILITY—the ability to do many things well—helps produce cold rolled steel that cuts rejects and costs by meeting special quality needs. Your Alan Wood Representative is the man to see. He has complete information on cold-rolled steel and its applications and can advise on type, gauge and size to order.

If necessary, he can arrange a metallurgical study of your situation that can help you eliminate production problems . . . cut costs . . . increase profits.

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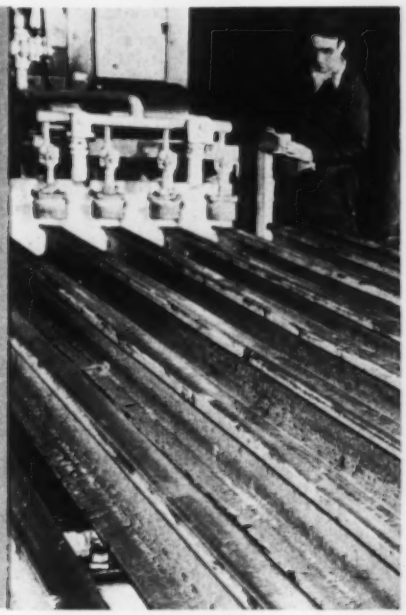
Rail Market Steadies after Beating

MILLS SHIPMENTS (Net tons)

	RAILS		ACCESSORIES		
	Standard (over 60 lb)	All Other	Joint Bars	Tie Plates	Track Spikes
1958	539,320	39,906	33,894	108,780	40,460
1957	1,194,405	88,563	79,942	230,941	73,752
1956	1,201,354	98,362	81,557	298,201	93,467
1955	1,150,977	82,767	68,314	311,411	93,097
1953	1,866,546	87,510	121,102	425,945	120,409
1950	1,705,000	116,000	114,000	416,000	139,000

Source: American Iron & Steel Institute.



U. S. Steel Corp.

Only three producers remain in the field, but they're the big ones and they aren't getting out. They expect improvement this year and hope for a steady future market

STEELMAKERS think shrinkage in the rail market has about reached its limit.

The three remaining producers (U. S. Steel Corp., Bethlehem Steel Co., and Colorado Fuel & Iron Corp.) are even somewhat optimistic about the chances of the market this year showing improvement over that in 1958. Last year's stomach-churning drop in shipments (see table) resulted primarily from railroad companies' reluctance or inability to lay out money for new rails during the recession.

But 1959 should see at least a partial recovery with standard rail shipments climbing back to around 600,000 tons, in the opinion of at least one producer. That's only about 55 per cent of 1957 shipments, but even that would be welcomed. Sales of joint bars, tie plates, and track spikes, which also took a sickening drop last year, are expected to improve in 1959 in direct proportion to rail sales.

• **Reasons for Decline** — Primary reason for the waning rail market is obvious to those who have followed accounts of the troubles plaguing the roads. Declining passenger and freight business means: 1. Fewer trains and less track replacement. 2. Revenues insufficent to replace worn rails. Instead track is being torn up where not needed and relaid where it is.

Some aspects of the declining rail market are decidedly more pleasant, at least to the railroads.

• **Better Rails** — Present rail sections are better designed than they were a few years ago. Maintenance is better than it used to be. Mechanization of manufacture cuts down on potential failures. End hardening was introduced a few years back and subsequently increased the life expectancy of rails. Heat treated rails are being used on curves where stress is greatest (producers say heat treated rails last three times longer than untreated ones, a fact that more than compensates for the initial higher cost).

• **Better Joints**—Also contributing to improved life expectancy is the welding of joints. One maker estimates that about 70 per cent of all rails produced in 1959 will be welded.

In the 1930s, Bethlehem Steel introduced "control cooled rails." It says controlling the cooling rate of rails just off the mill prevents transverse fissures, once a major reason for failure.

• **The Future** — The market has been described as "vanishing," but producers tend to belittle that word as unrealistic.

Last year, Inland Steel Co. went out of the rail producing business and U. S. Steel closed its railmak-

ing facilities in Pittsburgh. But don't look for any more cutting back. U. S. Steel, Bethlehem, and CF&I will stay in the business.

There will always be a need for rails. One producer estimates the present market potential at 900,000 tons yearly.

• **More Defection?** — Will the big companies vacate the field to smaller firms when the market declines to the point they no longer consider it profitable to hold capacity? No, answers an eastern producer, adding:

"The situation isn't going to change any. We'll always have plenty of capacity. Hell, with our investment in railmaking facilities we can't afford to give up the market. By the same logic, none of the smaller companies can afford to get in the business. The equipment just costs too much."

• **Where To?**—Producers forced out of the business have had to turn to other markets for selling their unfinished steel, but none admits having been hurt seriously. In fact, they appear nonchalant. One says:

"It was just the way business is sometimes. We kicked our salesmen in the pants a little and told them to find some other place to sell the steel."

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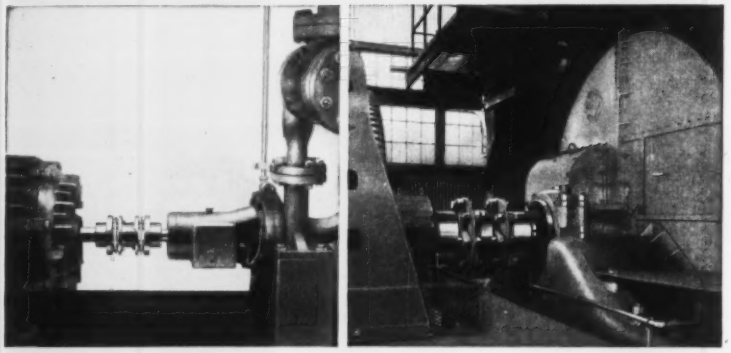

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THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Pittsburgh Screw & Bolt Adopts Net Pricing

Pittsburgh Screw & Bolt Corp., Pittsburgh, switched from the list and discount system of pricing industrial fasteners to an item net price schedule on Mar. 30.

Items affected: Regular square and hexagon head machine bolts, carriage bolts, lag bolts, and low carbon steel bright cap screws. The products account for about 75 per cent of the company's output; preparations are underway to extend the new system to other products.

The company is pricing its fasteners on the basis of quantity per item. The lowest or "extreme" price will apply at the level of three or four kegs or cases. Formerly, the "extreme" price began at 40,000 lb, and customers accumulated a variety of items to qualify.

In another departure from tradition, the company announced that shipments of over 20,000 lb (about a truckload) will be delivered with no freight charge.

Steel Bars . . .

Bar Prices, Page 121

Producers of hot-rolled carbon bars have little tonnage open in their schedules for second quarter delivery. They would have none if they had accepted all the orders offered in recent weeks. Some are appraising their commitments in an effort to determine how much tonnage they still will be able to accept for June, before closing their books for that month.

The situation also holds for alloy bars. There has been a spurt in alloy demand. One large mill is booked up to June on the small sizes of hot alloys and could readily find orders for more tonnage. Pressure for the large sizes is even greater. Some producers haven't any tonnage open for the remainder of the first half.

The situation in cold-drawn carbon and alloy bars depends on availability of hot stock. In certain sizes, fairly good delivery promises are

possible, but, in general, shipments are tightening rapidly.

Most bar suppliers are engaged at capacity, with consumers striving to push abnormally low inventories (15 to 20 days) up to 60-90 days by June 30. Some buyers overbought when the scramble for tonnage began, but few have seen fit to trim back their orders.

Green River Steel Corp., Owensboro, Ky., has been awarded 185 tons of chromium-moly alloy steel round bars by the Aviation Supply Office, Philadelphia.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 122

Reinforcing steel bar demand is increasing seasonally. But prices are weak. For example, in New England, fabricated and formed bars are going at as low as 7 to 8 cents a pound, delivered, and some distributors have ceased to quote on jobs at these prices. So distribution in the northeast is mostly limited to four sellers.

Piling requirements are heavier, notably in Maine.

Major bar contracts pending include 33,000 tons for the Wanapum Dam, bids to Ephrata, Wash., May 8. Another large job, Lake Washington floating bridge at Seattle, involves 5000 tons.

It's reported that imports of reinforcing bars approximate 40,000 tons monthly.

Alloy Steel . . .

Base prices on a number of vacuum melted, high temperature, high strength alloys used in jet aircraft and missiles have been reduced by Allegheny Ludlum Steel Corp., Pittsburgh. W. B. Pierce, vice president-sales, announced the base prices of forging billets of these alloys are: Altemp A-286, $1.60 a pound; Discaloy, $1.66; Altemp 1251, $3.57; Waspaloy, $6.15; and M-252, $6.15.

A new schedule of size extra charges for billets was also announced, partially offsetting the reductions in base prices.

Reductions were also made in base prices of plates, sheets, and cold-rolled strip of Altemp A-286. New prices: $2.73 a pound for plates and $2.85 for sheets and strip.

The revisions affect the more widely used high alloys made by the consumable electrode vacuum melting process and reflect increased production experience, says Mr. Pierce.

Wire . . .

Wire Prices, Pages 123 & 124

It begins to look like the wire business is coming out of the doldrums. Demand is "zooming," report eastern observers. One major producer says: "It looks like it's going to be our biggest March ever." He adds that current bookings indicate April will also set a record for that month.

Most producers say demand reflects the general improvement in the over-all business situation. How much of current volume is due to hedging against a possible summer steel strike is impossible to determine. One seller puts his views this way:

"Everyone is buying ahead, from producers of raw materials to consumers of finished products. I think

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LENOX
THE TOOLS IN THE PLAID BOX

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SPRINGFIELD, MASSACHUSETTS • U.S.A.

there's some hedge buying, and there certainly is evidence of increased consuming requirements, but the two are so closely interwoven that it is impossible to separate them." He adds that business in general seems to be slowing up somewhat, lending credence to another producer's theory that the spurt in wire is primarily due to hedging.

Buffalo district producers have been encouraged by the recent pick-up in demand. Their wire volume had lagged behind that of other products earlier this year, but it's coming along fast now due to heavy requirements for fence, mesh, and similar wire products.

Tubular Goods . . .

Tubular Goods Prices, Page 125

Direct mill shipment orders for seamless pipe are heavier. Utilities and pipe fabricating shops have covered their needs through the first half, but firm commitments from the utilities are under expectations.

Buttweld and seamless pipe distributors are slow to build stocks because their own order volume is lagging. If they don't act soon, they may find they have held off ordering too long. This is especially true in the case of seamless—mill stocks of 12 in. and under are dwindling.

Mechanical and pressure tubing shipments extend to ten weeks; some alloy tubing to 16 weeks.

A leading Pittsburgh producer reports major oil producers are taking all the tubing, casing, and drill pipe they can get before June 30. They want enough tonnage to carry them through September. But, says this producer, if such demands were to be met, a lot of customers would have to be squeezed out of its schedules.

While most mills are pretty well loaded with tonnage for the first half, they still have stocks for sale in the southwest. But downriver inventories are being sold faster than they're being replaced, and some sellers estimate their warehouse stocks will be exhausted by May. If there's no strike, replacement of downriver inventories will keep the mills fairly busy through the third quarter.

Pipemakers have mixed emotions about government restrictions on oil

imports. Some think they'll benefit. Reason: The move should encourage drilling by the smaller operators who normally account for about 60 per cent of the exploratory wells.

A leading producer of linepipe is sold out for the first half on seamless material and is booked through May on large sizes of electricweld.

Coast Facility To Make Stress-Relieved Strand

Facilities for the production of stress-relieved strand for prestressed concrete construction will be put into operation soon at the Pittsburg, Calif., Works, Columbia-Geneva Steel Div., U. S. Steel Corp. Stress relief treatment produces a higher elasticity in the treated strand, which, in turn, improves the strength of concrete bridges, buildings, and other structures.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 122 & 123

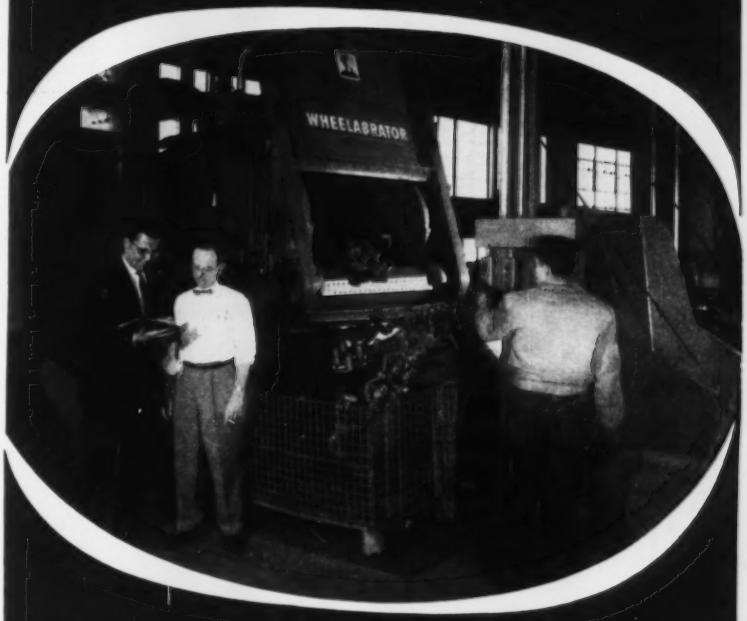
While pressure is still being exerted by consumers for all major grades of sheets for delivery in the first half of the year, ordering has lost some of its "push" because of the sold-up condition of the mills, and the disposition of buyers and sellers to move slowly on third quarter commitments.

Some sheet specialties, including low silicon sheets, are still available for second quarter shipment, but makers of these items are confident of full order books on practically every category before long.

Orders for cold-rolled sheets are not coming in the torrent of the recent past, but users aren't backing down on their commitments. In some cases, they're pressing for additional tonnage. Since most mills are sold out for the first half, though, buyers are finding it difficult to place new tonnage. One maker at Pittsburgh turned away more than 60,000 tons of flat-rolled business in the last few weeks.

Unforeseen production problems have forced some mills to close their books earlier than they had anticipated. One producer set up a "division output" plan in January and asked its sales offices to submit minimum and maximum estimates of customers' first half requirements. Salesmen were told they could order any tonnage within the mini-

WHEELABRATOR© STEEL SHOT SLASHES ABRASIVE COSTS 35%



AT EVINRUDE MOTORS

This impressive reduction in blast cleaning abrasive costs was accomplished by switching from a malleable type abrasive to Wheelabrator Steel Shot.

According to Mr. Joe Vinette, Foundry Superintendent, "Wheelabrator's Abrasive Engineer was very helpful in setting up a program of inspection, preventive maintenance, and proper operation of blast equipment. A simple record keeping system was established which resulted in better cost control information. Following his recommendations and switching to Wheelabrator Steel Shot, we have been able to cut our abrasive cost by $0.96 per wheel hour!"

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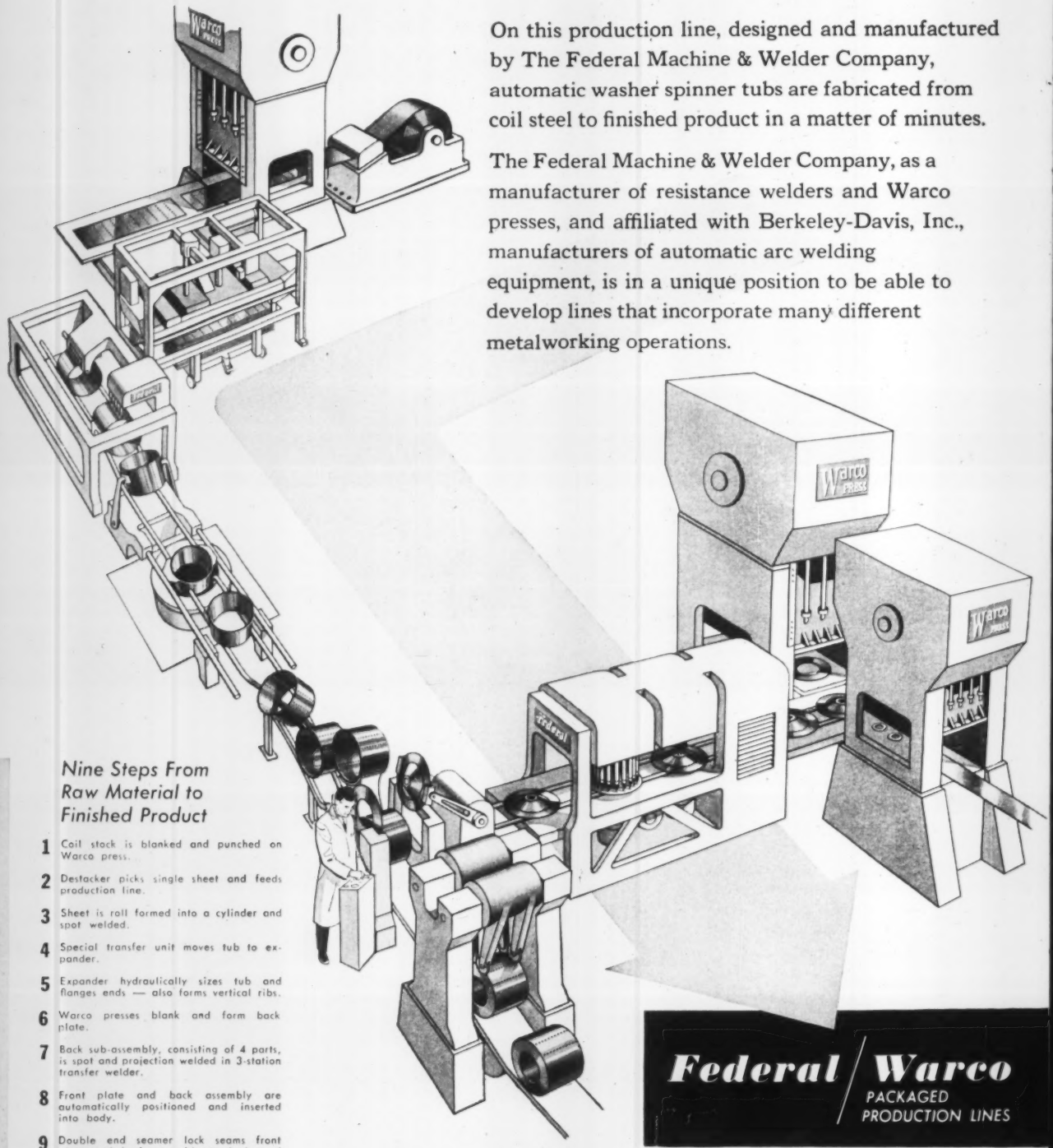
On this production line, designed and manufactured by The Federal Machine & Welder Company, automatic washer spinner tubs are fabricated from coil steel to finished product in a matter of minutes.

The Federal Machine & Welder Company, as a manufacturer of resistance welders and Warco presses, and affiliated with Berkeley-Davis, Inc., manufacturers of automatic arc welding equipment, is in a unique position to be able to develop lines that incorporate many different metalworking operations.



Nine Steps From Raw Material to Finished Product

1. Coil stock is blanked and punched on Warco press.
2. Destacker picks single sheet and feeds production line.
3. Sheet is roll formed into a cylinder and spot welded.
4. Special transfer unit moves tub to expander.
5. Expander hydraulically sizes tub and flanges ends — also forms vertical ribs.
6. Warco presses blank and form back plate.
7. Back sub-assembly, consisting of 4 parts, is spot and projection welded in 3-station transfer welder.
8. Front plate and back assembly are automatically positioned and inserted into body.
9. Double end seamer lock seams front plate and back assembly to body and ejects finished tub.

* Sequence of operations controlled by static relay system designed and built by Federal.

Federal / Warco
PACKAGED PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY, WARREN, OHIO
Affiliated with Berkeley-Davis, Inc., Danville, Illinois

mum-maximum range so long as they allowed 45 days' leadtime. The mill soon discovered that it had overestimated its ability to produce, and it had to cut off orders for June delivery at the end of February instead of Apr. 15.

Buyers hope to boost their sheet inventories to the five or six week level by June 30 (some talk of 90 days), but few will have that much protection against a strike when the steelworkers' labor agreement expires. Even those who have been promised everything they ordered are worried because they underestimated their consumption.

Galvanized sheets are sold out through the second quarter, but most producers still aren't taking orders for third quarter, except from "good" customers who insist on getting tonnage on mill books.

Medart Lockers Inc., St. Louis, has a contract for clothing locker metal, Quartermaster Purchasing Office, Columbus, Ohio, at $359,-594.

Revised extra books have been issued by Republic Steel Corp. incorporating a number of minor changes. A new card on cold-rolled carbon steel sheets is dated Mar. 9, superseding one in effect since Nov. 13, 1958. One on cold-rolled low carbon strip is dated Mar. 18, superseding one in effect since Dec. 20, 1955. One on silicon steel (nonoriented) coils and cut lengths, is dated Mar. 23, superseding one dated Feb. 8, 1956.

Active Domestic Demand Spurs Some Import Prices

Foreign steelmakers' interest in the American market has been quickened by the active demand on domestic mills. Increasing competition on some items (plates, barbed wire, and nails) has led to lower quotations on material imported from western continental Europe. But prices on certain other products (I-beams and hot-rolled sheets) are higher. Prices on imported deformed bars and wire rods are nominal.

In the Houston area (where considerable foreign steel has been coming in), prices on imported products have been upped $3 a ton; representatives of the foreign mills say more increases will probably follow. (See imported steel prices on Page 128.)

Plates . . .

Plate Prices, Page 121

An eastern producer said last week: "We're not going to give a lot of plates to some opportunist looking to make some easy money and then find ourselves unable to service our regular customers. Plates are still available. We're being forced to get a little picky about who gets what and how much."

Plate mills say there's more first half business in sight than they can handle. Including set-asides and orders, rolling capacity for the period appears to be solidly booked up. Producers, generally, are turning away orders, except for the third quarter. A few mills haven't opened their books for that delivery position.

Railroad carbuilders continue to exert pressure for tonnage for shipment before July 1. It reflects heavy car orders in recent weeks and the desire of builders to build up stocks as a hedge against a possible steel strike this summer.

Most fabricators say there has been no pickup in capital goods spending, though tank sales have improved appreciably the last few weeks.

Fabricators making standard products are trying to accumulate 45 to 60 day inventories by June 30, but some fear they won't be able to cover their third quarter requirements. Firms which specialize in highly engineered work are buying only the items that will be needed when jobs are placed.

New England plate shops are having difficulty placing orders for

Shipments of Steel Products—January, 1959

(Net tons; all grades)

Products	January, 1959 Carbon	Alloy	Stainless	Total	Total January, 1958
Ingots, etc.	8,977	9,010	1,671	19,658	24,222
Blooms, slabs, etc.	86,692	37,574	1,603	125,869	111,623
Tube rounds	1,599	476	3	2,078	2,018
Skelp	10,282	.....	.....	10,282	5,535
Wire rods	86,844	2,171	729	89,744	62,654
Structurals	326,711	3,596	26	330,333	449,115
Steel piling	30,139	.....	.....	30,139	35,292
Plates	474,069	31,722	3,105	508,896	523,683
Rails (standard)	52,845	.....	.....	52,845	55,172
Rails (all other)	3,298	.....	.....	3,298	3,116
Joint bars	2,146	.....	.....	2,146	2,014
Tie plates	6,661	.....	.....	6,661	8,981
Track spikes	3,406	.....	.....	3,406	3,617
Whee's	14,366	23	.....	14,389	21,907
Axles	5,101	16	.....	5,117	14,305
Bars (hot rolled)	477,092	142,864	3,269	623,225	468,304
Bars (reinforcing)	134,331	.....	.....	134,331	118,203
Bars (cold drawn)	96,758	21,700	4,325	122,783	89,161
Tool steel	819	6,726	.....	7,545	6,549
Standard pipe	179,474	41	.....	179,515	167,561
Oil country goods	149,727	33,989	.....	183,716	147,600
Line pipe	221,803	16	.....	221,819	228,454
Mechanical tubing	45,591	21,347	301	67,239	48,399
Pressure tubing	20,095	5,228	1,162	26,485	23,157
Drawn wire	209,978	3,180	2,284	215,442	181,860
Nails & staples	30,380	.....	1	30,381	32,196
Barbed wire	3,960	.....	.....	3,960	4,373
Woven fence	11,315	.....	.....	11,315	14,568
Bale ties, etc.	7,337	.....	.....	7,337	1,479
Black plate	50,683	.....	.....	50,683	53,242
Tin plate (HD)	30,304	.....	.....	30,304	31,455
Tin plate (electro)	417,210	.....	.....	417,210	474,359
Sheets (HR)	703,509	25,325	2,183	731,017	510,560
Sheets (CR)	1,322,809	5,697	10,400	1,338,906	873,336
Sheets (galvanized)	279,244	.....	.....	279,244	186,649
Sheets (other coated)	26,103	.....	.....	26,103	16,499
Elec. sheets, strip	3,014	47,188	.....	50,202	38,309
Strip (HR)	108,291	2,029	825	111,145	82,787
Strip (CR)	91,231	1,491	18,678	111,400	93,103
Total, 1959	5,734,194	401,409	50,565	6,186,168	.....
Total, 1958	4,863,518	310,344	41,555	.....	5,215,417

Data from American Iron & Steel Institute.

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sheared plates. Some of their hedge tonnage is being worked into June mill schedules. Forward buying of universal plates has broadened. Some platemakers expect a carryover from the second quarter on sheared plates.

Current ordering is largely hedging against possible strike-induced shortages this summer. Large plate jobs are lacking, and fabricating shop operations are better but under capacity.

The Navy has placed the bulk of 15,000 tons of plates for second quarter delivery. Grade Hy-80 accounts for the bulk of the tonnage.

Distributors . . .

Prices, Page 126

First quarter bookings by steel service centers were below expectations. While business was heavier than in the preceding quarter, the gain was negligible, compared with the spurt recorded by mills.

Comments by distributors in the New York area are typical. They claim "great disappointment in this so-called comeback period."

It's a general lag, they say, and not confined to specific products. One advances this reason for his lack of customers: "Our biggest competitors are the mills. They're busy, but not too busy to service customers we ordinarily would get in a boom time. Everyone is buying, but they're buying at the mills and we (distributors) are left to scrounge around at the edges for what few customers we can get."

No shortage of sheets, or other products, is noted. Demands for structurals and tubular products are slow.

Consensus is that mills will have to get "substantially busier before distributors will notice any resounding improvement." Many believe third quarter business will be "lousy" whether or not there is a steel strike. They think that the mills are going to do at least 65 per cent of the entire year's business in the first half.

Structural Shapes . . .

Structural Shape Prices, Page 121

Eastern structural steel fabricators are becoming more selective in their bidding. They are not going too far afield (geographically) for orders, and they are sticking more closely to their normal type work. Reasons: Better inquiries and the possibility of more seasonal gains.

Competition continues keen and is apparent in close price figuring. Composite beam and stringer tonnage has sold down to 11 cents a pound, fabricated and delivered, in New England. Bridge contractors, usually quoting under engineers' estimates, are shopping for low prices.

The bulk of bridgework in New England (stringer, rolled beam, and wide flange) permits structural fabricating shops to cover on forward steel requirements. But anticipatory buying of plain material is conservative, and eastern mills have open space in their schedules for late May and June orders in numerous sizes. At least two New England fabricators have bought imported structurals.

Delivery promises on wide flange structurals are tightening more noticeably than are delivery promises on standard shapes.

West coast highway builders expect an active season ahead. California's 1959-60 highway budget of $610 million is a record. The state's bridge department plans to spend twice as much as it did in the preceding year. Fabricators in the Pacific Northwest are booking an increasing volume of small lot orders. Their order backlogs will carry them pretty well through the summer.

Larger Galvanized Sheet Use Predicted This Year

Galvanized sheet shipments for use in air conditioning, heating, and ventilating equipment during 1958 increased 18.3 per cent over 1957, reports the Committee on Galvanized Steel Sheet Research. Makers of this equipment received 135,751 tons during the year, vs. 114,769 in 1957. The figures do not include the large tonnage bought through distributors and dealers.

The increase about matched that in total shipments reported by the galvanized sheet steel industry.

The committee predicts a sharp increase this year. It notes increased use of galvanized steel ductwork in residential building and important technical developments in commercial air conditioning and heating, such as the high velocity air system.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

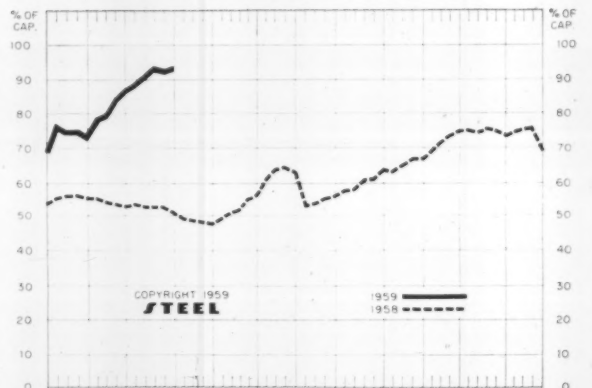
	Week Ended Mar. 29	Change	Same Week 1958	Same Week 1957
Pittsburgh	94	0	55.5	93.5
Chicago	95	0*	53.5	88.5
Eastern	91	0	51	95
Youngstown	92	0	47	91
Wheeling	93	— 2	72.5	79.5
Cleveland	101	+ 7.5*	32	92
Buffalo	105	0	37	100
Birmingham	88.5	+ 0.5	47.5	99
Cincinnati	93.5	+ 2.5*	53	72
St. Louis	89.5	+ 4*	70	99
Detroit	98.5	— 2.5*	28	96
Western	95	— 1	67	106
National Rate	93	+ 0.5	50.5	93

INGOT PRODUCTION‡

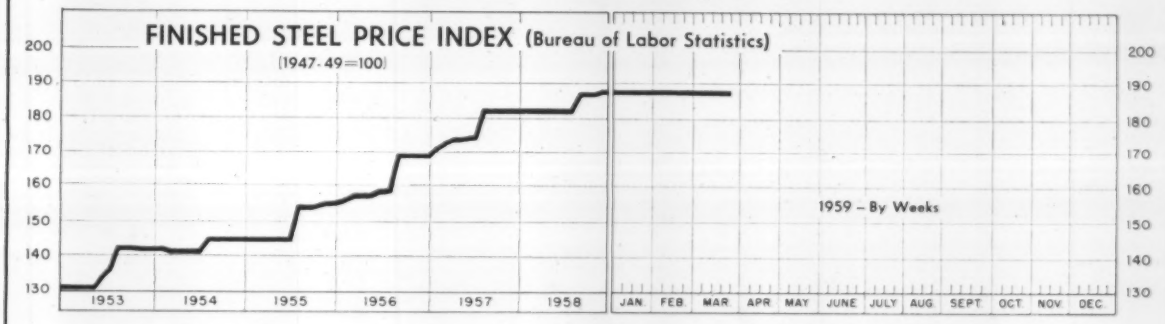
	Week Ended Mar. 29	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	163.5†	163.8	156.0	85.0
NET TONS (In thousands)	2,627†	2,631	2,506	1,366

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Mar. 24, 1959	Week Ago	Month Ago	March Avg	Year Ago
186.7	186.7	186.9	186.7	181.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended March 24

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing (lb)	0.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon (lb)	10.710
Tie Plates	6.875	Bars, C.F., Alloy (lb)	14.125
Axles, Railway (lb)	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon (lb)	6.350
Plates, Carbon (lb)	6.350	Sheets, C.R., Carbon (lb)	7.300
Structural Shapes (lb)	6.167	Sheets, Galvanized (lb)	8.615
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.673
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical (lb)	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon (lb)	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy (lb)	10.775	Strip, H.R., Carbon (lb)	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon (lb)	6.675	Pipe, Galv., Buttweld (100 ft)	23.253
		Pipe, Line (100 ft)	199.53
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	207.483
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	March 25 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.73
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	39.33	41.67	42.83	34.50	24.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	March 25 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.10
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.10
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods 7/32-5/8" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton	March 25 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	60.16
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld, Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$38.50	$44.50	$44.50	$34.50	$25.50
No. 1 Heavy Melt, E. Pa.	38.00	38.00	40.00	38.50	22.00
No. 1 Heavy Melt, Chicago	41.50	42.50	44.00	30.50	25.50
No. 1 Heavy Melt, Valley	43.50	45.50	48.50	34.50	23.50
No. 1 Heavy Melt, Cleve.	39.50	41.50	44.50	31.50	20.50
No. 1 Heavy Melt, Buffalo	39.50	39.50	41.50	28.50	24.00
Rails, Rerolling, Chicago	62.50	62.50	63.50	54.50	34.50
No. 1 Cast, Chicago	48.50	48.50	49.50	41.50	33.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25

WHY BUY METAL YOU DON'T USE?

Switch to Allegheny Ludlum Cast-to-Shape Tool Steel

FORGING

Stepped-out forging for fabricating spinning cone: 2300 lbs.—$2691 material cost plus cost of machining.

CAST-TO-SHAPE

Cast-to-shape spinning cone 1059 lbs. $860.97 Includes cost of the pattern.

$1,831 Saved by changing to Cast-to-Shape

Why pay for metal that ends up as chips on your floor? Here are two fine reasons for switching to Allegheny Ludlum cast-to-shape tool steels.

CAST-TO-SHAPE MEANS YOU BUY FEWER POUNDS OF METAL.
Because the tool you buy is closer to its finished shape, you obviously spend less money on original metal. In the above example, the savings in metal cost alone amount to $1,894.

CAST-TO-SHAPE MEANS LESS FINISH MACHINING.
A casting like that above has only ¼ to ⅜ inches of machine stock on all surfaces, requiring very little machining compared to solid chunks. Cast-to-shape tooling is especially economical when working with intricate shapes.

Allegheny Ludlum, a tool steel producer who makes cast-to-shape materials, casts them with the same precise quality control for which their tool steels is known. A full line of cast-to-shape tool steel grades is available. You'll find ones with high resistance to abrasion, compressive strengths of approximately 400,000 psi, easy machinability, hardening with almost no distortion, toughness, high red hardness, and the capacity to take a high polish.

Find out now how you can cut costs on your complex tools. Write for FC-4, a 28-page technical discussion of A-L's Forging and Casting Division with applications, pattern information, design tips, analyses, and heat treating instructions. Or call your nearest A-L tool steel warehouse or distributor.

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Tool Steel warehouse stocks throughout the country . . . Check the yellow pages

EVERY GRADE OF TOOL STEEL . . . EVERY HELP IN USING IT

Steel Prices

Mill prices as reported to STEEL, March 25, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 122, footnotes, page 124.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ....80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ....80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....113.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ..119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
N.Tonawanda,N.Y. B11..6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ....5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ....5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
Los Angeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .../....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich(9) G5 ....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 ....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded
(Including leaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N. J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N. J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md. (5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ....9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.926
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.425
S.Chicago,Ill. R2, W14 .5.675
S.Duquesne,Pa. U5 ...5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated; To Consumers)

Baltimore R2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 ....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle B3, N14 .....7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00

McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt) L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.875
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Lackawanna,N.Y. B2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14..7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....9.275
Cleveland J5, R2 ....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ...9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
SparrowsPt. B2	7.225	....
Pittsburgh J5	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Asland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co., Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.
U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.
W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Corp.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2,Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. F4	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven, Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J. R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10

TIN PLATE, American

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)	T-72	T-65	T-58	T-52
Fully Processed (Semiprocessed ½c lower)				
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity, Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
N.Tonawanda,N.Y. B11	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W2	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt., Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	10.05
Worcester,Mass. A7	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass. A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
Franklin Park,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg)
To Dealers (33)

Wheeling,W.Va. W10	$9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
Los Angeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
Sterling(37)N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70§§
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras. §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1⅛ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread)& Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts
(Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam.	50.0
¾ in. diam	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam.	34.0

NUTS
(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy
Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅛ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅛ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	20.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalizied with Birmingham except where equalization is too great.
Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15.0%.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	.....
KansasCity,Mo. U3	29.85	43.40	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	.....	43.40	55.40	73.00	.....
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St. Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		⅝		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	28.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	31.50	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	29.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	32.75	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	34.00	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	34.50	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	38.25	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	39.75	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	51.25	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	63.75	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	51.25	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	62.25	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	41.50	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	22.25	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	34.75	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	22.50	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company, Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$35.85	$42.50

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3, nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	W Hot Wk. (H-21)	1.425-1.44
Oil Hardening (O-1)	0.505	V-Cr Hot Work (H-13)	0.550
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24 #	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85 #	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	9.31	10.40	11.97	53.50	9.73	10.11	13.39 #	15.71	10.01	10.02	11.85
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45 #	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.64
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.53 #	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	11.30	52.33	8.63	9.10	11.25 #	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.15[2]	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25 #	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25 #	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.25	10.61	52.71	9.25	9.40	11.95 #	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25 #	15.05	9.00	8.89	10.20
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[6]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.35	11.55	12.55	57.38	10.80	11.05	14.70	16.80	10.25	10.15	13.05
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

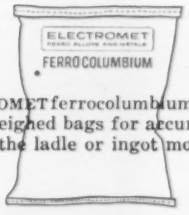
Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

"UNION CARBIDE METALS *is working with us on columbium-treated carbon steels"*

The effect of columbium in improving the strength and weldability of mild carbon steels was discovered in 1936 by UNION CARBIDE METALS (U. S. Patent No. 2264355). This discovery was made available to the steel industry. Now, long-standing government restrictions on using columbium have been removed. Columbium is in plentiful supply. New ore sources and refining processes have been found.

UNION CARBIDE METALS is therefore conducting a further extensive evaluation of columbium-treated steels. Results of this continuing investigation will also be made available to the steel industry. For information on columbium, contact UNION CARBIDE METALS, pioneer in the production of highly soluble, high-purity ferrocolumbium since 1935.

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.



ELECTROMET ferrocolumbium is offered in pre-weighed bags for accurate additions to the ladle or ingot molds.

UNION CARBIDE METALS

Electromet *Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Curtner, Calif., $185; Canon City, Colo., $183.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.
60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.
70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$10.75-11.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%. Indian (export tax included) $0.915-$0.965 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00
South African Transvaal	
44% no ratio	19.75-21.00
48% no ratio	29.00-31.00
Turkish	
48% 3:1	51.00-55.00
Domestic	
Rail nearest seller	
48% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: 98% Fe: F.o.b. Camden or Riverton, N. J., freight allowed east of Mississippi River, ocean bags, 23,000 lb and over	11.25
Sponge Iron, Domestic, 98% Fe: F.o.b. Riverton, N. J., freight allowed east of Mississippi River: 100 mesh, 100 lb bags	11.25
100 mesh, 100 lb pails	9.10‡
40 mesh, 100 lb bags	8.10
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16, plus 100 mesh)	29.00

	Dollars
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum: Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.40-50.90†
Bronze, 5000-lb lots	52.20-56.20†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	52.80-57.20†
Phosphor-Copper, 5000-lb lots	64.60
Copper (atomized) 5000-lb lots	45.10-53.60†
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	nom.**
1000 lb	2.80
less 1000 lb	2.95
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.75
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.75
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	39.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal. f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	*24.00*
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, del.	
Phenol, 90 per cent grade	15.50
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.40	$5.40	$5.30	$5.75
Bar Size Angles	5.10	5.10	5.00	5.43
Structural Angles	5.10	5.10	4.90	5.43
I-Beams	*5.11*	*5.11*	*5.01*	*5.45*
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	*6.37*	*6.37*	*6.37*	*6.69*
Sheets, H.R.	*8.25*	*8.25*	*8.25*	*8.55*
Sheets, C.R. (drawing quality)	8.45	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.76	25.64	25.64	26.51
Barbed Wire (†)	*6.55*	*6.55*	*6.55*	*6.90*
Merchant Bars	*5.35*	*5.35*	*5.30*	*5.85*
Hot-Rolled Bands	7.15	7.15	7.15	7.50
Wire Rods, Thomas Commercial No. 5	5.19	5.32	5.14	5.49
Wire Rods, O.H. Cold Heading Quality No. 5	5.09	6.22	6.04	6.34
Bright Common Wire Nails (§)	*7.85*	*7.75*	*7.67*	*8.20*

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.006% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, carload 45.75c, ton lot 47.25c, less ton lot. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c, less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

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BLAW-KNOX COMPANY

Blaw-Knox Equipment Division
Pittsburgh 38, Pennsylvania

Scrap Index Hits New Low for Year

STEEL's composite on No. 1 heavy melting steel drops to $39.33, off $2.34 from preceding week. Limited mill buying at lower level sets price pace in sluggish market

Scrap Prices, Page 132

Pittsburgh — The market broke sharply last week when a local mill bought a representative tonnage of No. 1 heavy melting at $39, No. 1 dealer bundles at $43, and No. 2 bundles at $27. (The buyer explained that the dealer bundles were clips from an automotive source and "just as good" as factory bundles.)

When district steelmaking operations crossed the 90 per cent barrier and the mills failed to buy, dealers thought they could hold out for 97 per cent. But operations leveled off at 94 per cent and the mills stayed out of the market, using hot metal, inventories, home scrap, and metal returned by customers. All signs point to a drop of at least $2 in the industrial lists. Dealers are in a mood to sell at the best prices they can get.

Chicago—District steel mills entered the market last week. They were in the driver's seat. Prices softened $1 and $2 a ton in most categories. Sample purchases: No. 1 heavy melting (industrial), $42; No. 1 railroad heavy melting, $45; No. 1 factory bundles, $46; machine shop turnings, $20. There's plenty of metal available at those prices, say buyers.

Philadelphia—There's not much change in the market from a week ago. Price changes last week were: No. 2 heavy melting, $33; short shoveling turnings, $25-$26; heavy turnings, $35-$36.

Talk in the market largely centers on the amount of scrap being scheduled for export. Three cargoes will leave this port within the next six weeks. Most of the material is for Japanese account.

New York—The steel scrap market is softening due to a lag in domestic demand and a freer flow of material. Yard scrap is more readily available because of milder weather, but more manufacturers scrap is being generated.

Brokers' buying prices for No. 1 heavy melting and No. 1 bundles are lower at $29-$30, No. 2 heavy melting at $26-$27, and No. 2 bundles at $18-$19. Low phos structurals and plates also are lower, brokers offering $35-$36. The cast iron grades are steady. Stainless scrap (type 430) sheets, clips, and solids are being quoted $85-$90.

Buffalo—Little new business is reported, but prices are steady. Dealers think quotations may drift slightly lower in April. The mills are using large scrap tonnage, but they're buying sparingly. They hold substantial inventories.

Cleveland — Although sales are lacking, scrap prices here and in the Valley are off about $2 a ton, reflecting sharply lower prices at Pittsburgh. In the absence of sales, however, quoted prices are nominal. Continued sluggish demand in the

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face of the highest steelmaking operations in months is particularly discouraging for dealers. The Cleveland ingot rate last week was estimated at 101 per cent of capacity, while Valley operations were 92 per cent.

A major steelmaker in the Valley placed an order for No. 2 bundles at $27, the first order for this grade placed in the Valley area in 21 months. The same steelmaker's last purchase of this grade was made in June, 1957. Some observers expect new orders for No. 1 to come out early in April.

Detroit — Prices are off sharply here in a sluggish market. Indications are the auto lists will go at much lower levels than they did a month ago—as much as $5 a ton lower, some observers say. Based on bids for auto tonnage on the initial offering at monthend, the market is off $2 to $5 a ton.

Cincinnati — District steel mills are expected to enter the market this week, and it would not surprise dealers if their offering prices were off as much as $2 a ton on the No. 1 grades. Brokers anticipate general market softness in the weeks ahead with consumers living off inventories.

St. Louis—Demand was off slightly from recent levels last week, but a pickup in buying is expected this week. Prices are holding. The only change last week was on No. 1 railroad heavy melting, which dropped 50 cents a ton to $41.50. Mill inventories are adequate.

Birmingham—With material piling up in their yards and little tonnage moving out, dealers in this district are increasingly pessimistic over market prospects. Especially depressing is the lack of buying for open hearths despite rising production.

Houston—Prices are unchanged in a featureless market. Mill orders have been filled, and buying for export is slow. Demand on Mexican account is nonexistent. The price downtrend is expected to continue through April.

Seattle—Domestic consumers hold large inventories, and they are indifferent to dealers' offerings. Larger scrapyards are working on export allocations. They anticipate an early revival of Japanese requirements. With little material moving, prices are unchanged, but nominal.

San Francisco—Japanese negotiations for 900,000 tons of scrap still feature the market. All the tonnage will not be placed on the West Coast, but, based on experience, dealers expect the major part of it to be.

Los Angeles—Mills are showing little interest in adding to their substantial inventories. Collections are fair, but dealers are having difficulty getting quality material.

Pig Iron . . .

Pig Iron Prices, Page 126

Demand for merchant pig iron is improving gradually, but the pickup so far this year has been below expectations. Buying by foundries is fairly steady, but generally in conservative quantities. No movement to accumulate large inventories as a hedge against a steel strike is apparent.

Some fairly substantial bookings have been made for shipment of iron west on the Great Lakes from Buffalo as soon as the navigation season opens.

Producers continue to increase output. Youngstown Sheet & Tube Co. has blown in the No. 1 blast furnace at its Campbell (Ohio) Works. The stack was knocked out of operation over a month ago by collapse of a raw material trestle.

Only six of the 25 Youngstown district furnaces are out of blast, but some aren't in shape to operate quickly, even with repairs. Sharon Steel Corp. has two furnaces out, one of which will be ready soon. U. S. Steel Corp. is rebuilding one of its two furnaces idle in the district, and expects to have it ready for operation in May.

In the Buffalo district, 14 of 16 blast furnaces are making iron. Another is due to go into production early in April, and, if iron demand warrants, the final idle stack may come into production in the second quarter.

Iron Ore . . .

Iron Ore Prices, Page 128

Substantial tonnages of Lake Superior iron ore have been sold for delivery during 1959 at the same prices that prevailed throughout 1958. While these sales set the market for the present, John S. Wilbur, vice president-sales and marine, Cleveland-Cliffs Iron Co., Cleveland, says the prices are subject to review later in the season. This is taken to mean a wage settlement at midyear may necessitate some revision in the price schedule.

Lake Superior iron ore prices have not been boosted since 1957, the shippers absorbing increased labor costs, and higher railroad and vessel rates in the interim. For the iron ore price schedule see Page 127.

Iron Ore Co. of Canada, an affiliate of Hanna Mining Co., Cleveland, is undertaking development of an iron ore property in the Wabush Lake area of Labrador (see STEEL, Feb. 23, p. 111) at a cost of nearly $200 million. The project will be completed in 1962, including a plant to produce 6 million tons of high grade concentrates an-

(*Please turn to Page* 137)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, March 25, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 25	$39.33
Mar. 18	41.67
Feb. Avg.	42.58
Mar. 1958	35.83
Mar. 1954	24.37

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 dealer bundles	*42.00-43.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*38.00-39.00*
No. 1 factory bundles	*49.00-50.00*
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*22.00-23.00*
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut structurals:	
2 ft and under	51.00-52.00
3 ft lengths	50.00-51.00
Heavy turnings	*34.00-35.00*
Punchings & plate scrap	52.00-53.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Random rails	55.00-56.00
Railroad specialties	51.00-52.00
Angles, splice bars	51.00-52.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	*42.00-43.00*
No. 1 hvy melt., dealer	*40.00-41.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 factory bundles	*45.00-46.00*
No. 1 dealer bundles	*41.00-42.00*
No. 2 bundles	*27.00-28.00*
No. 1 busheling, indus.	*42.00-43.00*
No. 1 busheling, dealer	*40.00-41.00*
Machine shop turnings	*20.00-21.00*
Mixed borings, turnings	*22.00-23.00*
Short shovel turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Cut structurals, 3 ft	*46.00-47.00*
Punchings & plate scrap	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	44.00-45.00
Unstripped motor blocks	38.00-39.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Angles, splice bars	53.00-54.00
Axles	71.00-72.00
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles & solids	215.00-225.00
18-8 turnings	120.00-125.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 busheling	*43.00-44.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*27.00-28.00*
Machine shop turnings	*17.00-18.00*
Short shovel turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Low phos.	*45.00-46.00*
Electric furnace bundles	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00

CLEVELAND

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 factory bundles	*44.00-45.00*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*39.00-40.00*
Machine shop turnings	*14.00-15.00*
Short shovel turnings	*20.00-21.00*
Mixed borings, turnings	*20.00-21.00*
Cast iron borings	*20.00-21.00*
Cut foundry steel	*39.00-40.00*
Cut structurals, plates 2 ft and under	*46.00-47.00*
Low phos, punchings & plate	*40.00-41.00*
Alloy free, short shovel turnings	*22.00-23.00*
Electric furnace bundles	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Charging box cast	*38.00-39.00*
Heavy breakable cast	*38.00-39.00*
Stove plate	*44.00-45.00*
Unstripped motor blocks	*33.00-34.00*
Brake shoes	*36.00-37.00*
Clean auto cast	*47.00-48.00*
Burnt cast	*37.00-38.00*
Drop broken machinery	*50.00-51.00*

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	59.00-60.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	54.00-55.00
Cast steel	48.00-49.00
Railroad specialties	52.00-53.00
Uncut tires	45.00-46.00
Angles, splice bars	53.00-54.00
Rails, rerolling	58.00-59.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-125.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	38.00
No. 2 bundles	27.00
No. 1 busheling	38.00
Machine shop turnings	20.00
Short shovel turnings	22.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	41.00
Clean auto cast	50.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*41.50*
Rails, 18 in. and under	53.00
Rails, random lengths	47.50
Rails, rerolling	59.00
Angles, splice bars	49.00

BIRMINGHAM

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	21.00-22.00
No. 1 busheling	33.00-34.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	25.00-26.00
Bars, crops and plates	*41.00-42.00*
Structurals & plates	*40.00-41.00*
Electric furnace bundles	39.00-40.00
Electric furnace:	
2 ft and under	38.00-39.00
3 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	*40.00-41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	51.00-52.00
Rails, rerolling	55.00-56.00
Rails, random lengths	43.00-44.00
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	38.00
No. 2 heavy melting	*33.00*
No. 1 bundles	41.00
No. 2 bundles	24.00-26.00
No. 1 busheling	40.00
Electric furnace bundles	42.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	*25.00-26.00*
Machine shop turnings	21.00-22.00
Heavy turnings	*35.00-36.00*
Structurals & plate	44.00-45.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast.	43.00
Drop broken machinery	49.00-50.00
Malleable	68.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*18.00-19.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	16.00-17.00
Low phos. (structurals & plates)	*35.00-36.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	24.00-25.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	*85.00-90.00*

BUFFALO

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	39.00-40.00
No. 2 bundles	27.00-28.00
No. 1 busheling	39.00-40.00
Mixed borings, turnings	20.00-21.00
Machine shop turnings	18.00-19.00
Short shovel turnings	22.00-23.00
Cast iron borings	20.00-21.00
Low phos structurals and plate, 2 ft and under	47.00-48.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	49.00-50.00
Rails, 3 ft and under	55.00-56.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.50-38.50
No. 2 heavy melting	32.50-33.50
No. 1 bundles	37.50-38.50
No. 2 bundles	24.00-25.00
No. 1 busheling	37.50-38.50
Machine shop turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	21.00-22.00
Cast iron borings	19.00-20.00
Low phos., 18 in.	47.00-48.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast.	40.00-41.00
Charging box cast	38.00-39.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	50.00-51.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	38.00
No. 2 heavy melting	35.00
No. 1 bundles	38.00
No. 2 bundles	23.00†
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	43.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	30.00
No. 2 heavy melting	23.00-23.50
No. 1 bundles	30.00
No. 1 busheling	30.00
Machine shop turnings	11.00-11.50
Short shovel turnings	13.00-14.00
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*18.00-19.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*16.00-17.00*
No. 1 busheling	*30.00-31.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	16.00-17.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Stove plate	*30.00-31.00*
Charging box cast	*31.00-32.00*
Heavy breakable	*32.00-33.00*
Unstripped motor blocks	*20.00-21.00*
Clean auto cast	*45.00-46.00*

SEATTLE

No. 1 heavy melting	33.00
No. 2 heavy melting	31.00
No. 1 bundles	29.00†
No. 2 bundles	23.00†
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast.	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	*35.00*
No. 2 bundles	21.00
Machine shop turnings	*16.00*
Shoveling turnings	*18.00*
Cast iron borings	*18.00*
Cut structurals and plate 1 ft and under	*49.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*41.00*

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast.	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

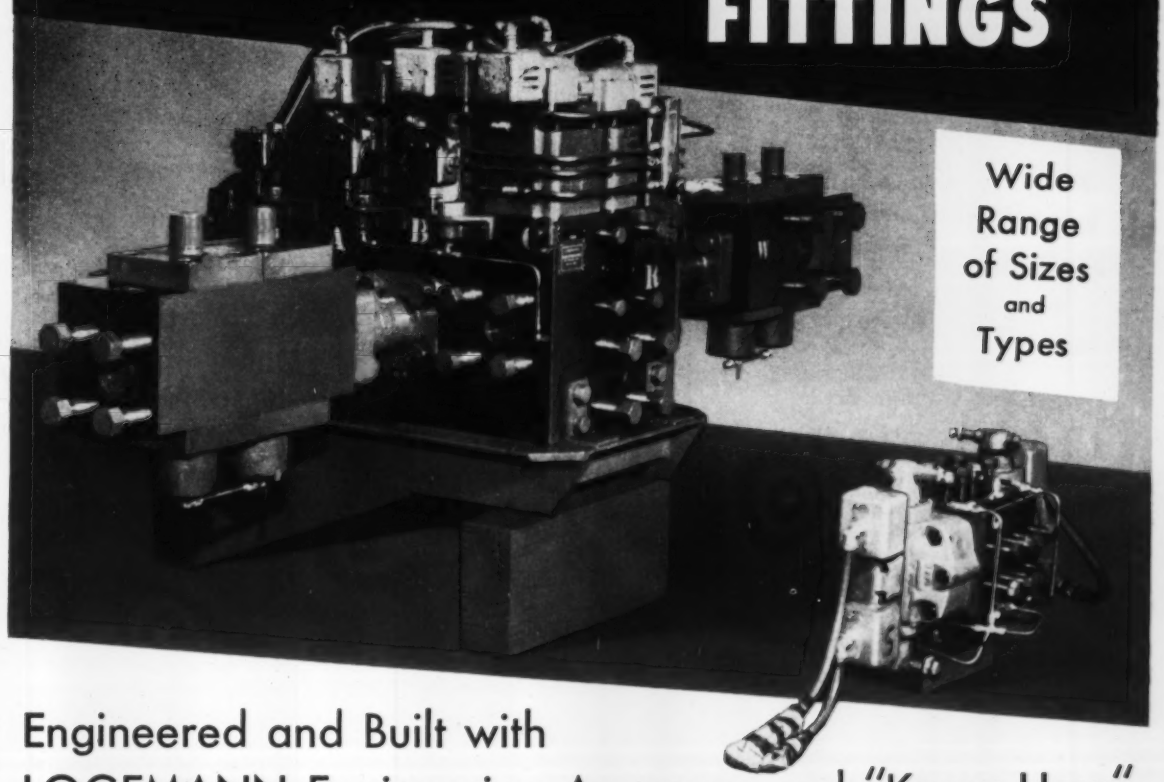
No. 1 heavy melting	34.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Mixed borings, turnings	15.00
Busheling, new factory:	
Prepared	34.50
Unprepared	28.50
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	45.00

†Nominal.
‡F.o.b. Hamilton, Ont.

LOGEMANN
HYDRAULIC VALVES *and* FITTINGS



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Copper Calms Down

Chances for a price hike appear slimmer, but there are still too many uncertain factors in the market to rule one out. Aluminum output could set record this year

Nonferrous Metal Prices, Pages 136 & 137

AFTER SEVERAL MONTHS of simmering, the copper market has failed to come to a boil even though all the ingredients have been present.

• **Waiting and Watching** — Users are sitting back to see whether the situation will cool off or get hotter. It doesn't mean demand hasn't held up, far from it. But there has been a definite letup in the hectic buying that marked the last few weeks.

These were the developments late last week:

1. The London Metal Exchange price slipped to 30.5 cents, down 2 cents from the previous week.

2. Activity in copper futures on the commodity exchange eased.

3. Dealers were quoting 33 cents a pound after having been at 34 and 35 cents.

4. Kennecott Copper Corp.'s strike at its Ray Mine Div. ended.

5. Custom smelter scrap intake increased while demand fell. Result: As STEEL went to press, metalmen were expecting the price to fall momentarily.

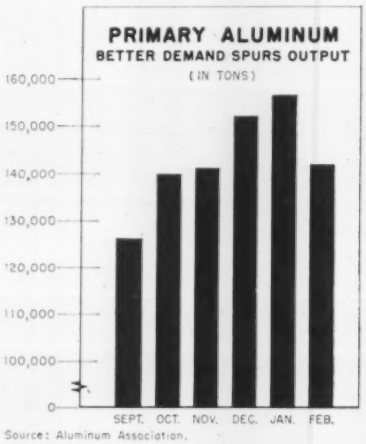
Collectively, those factors temporarily take the pressure off the primary quotation. Don't rule out a hike, but it probably won't come in the next couple of weeks.

• **Caution**—If you're a copper user, better not let a sigh of relief too soon. The market's still unsteady. Some mines are down because of walkouts, and more labor trouble may be on the horizon. Customer fears of a shortage remain.

The government evidently doesn't feel such a situation is likely. Washington spokesmen have indicated they see no necessity to temporarily suspend the 1.7 cent a pound duty to allow more metal to enter the U. S. They're also doubtful any move will be made to release any of the copper in the government's Defense Production Act inventory.

Aluminum Output Climbs

If the primary aluminum industry continues to operate at its present rate, production this year will be the highest in history. Proof:



Source: Aluminum Association.

January output set an all-time record of 156,708 tons (see chart). February figures of the Aluminum Association read 142,116 tons, which is a higher daily output than that of January. March should see another record — probably 158,000 to 159,000 tons of primary metal.

The industry is operating at an annual rate of 1,827,000 tons (capacity is 2,230,250 tons). Comparison: Last year's output was 1,565,556 tons.

Will Study Scandium

Add another name to the list of rare metals being considered for the Space Age. Union Carbide Metals Co., a division of Union Carbide Corp., has been awarded two contracts (total, about $60,000) by the Air Force to study scandium, a metal which has received scant attention though known for 80 years.

Under one of the contracts, Union Carbide will investigate the metal's physical, mechanical, and chemical properties. The other contract calls for it to produce 1 lb of scandium of 99 per cent purity (cost, around $20,000).

Scandium is a sparsely distributed mineral usually found with uranium and the rare earths. It has about the same density as aluminum but a much higher melting point — around 2820° F.

Market Memos

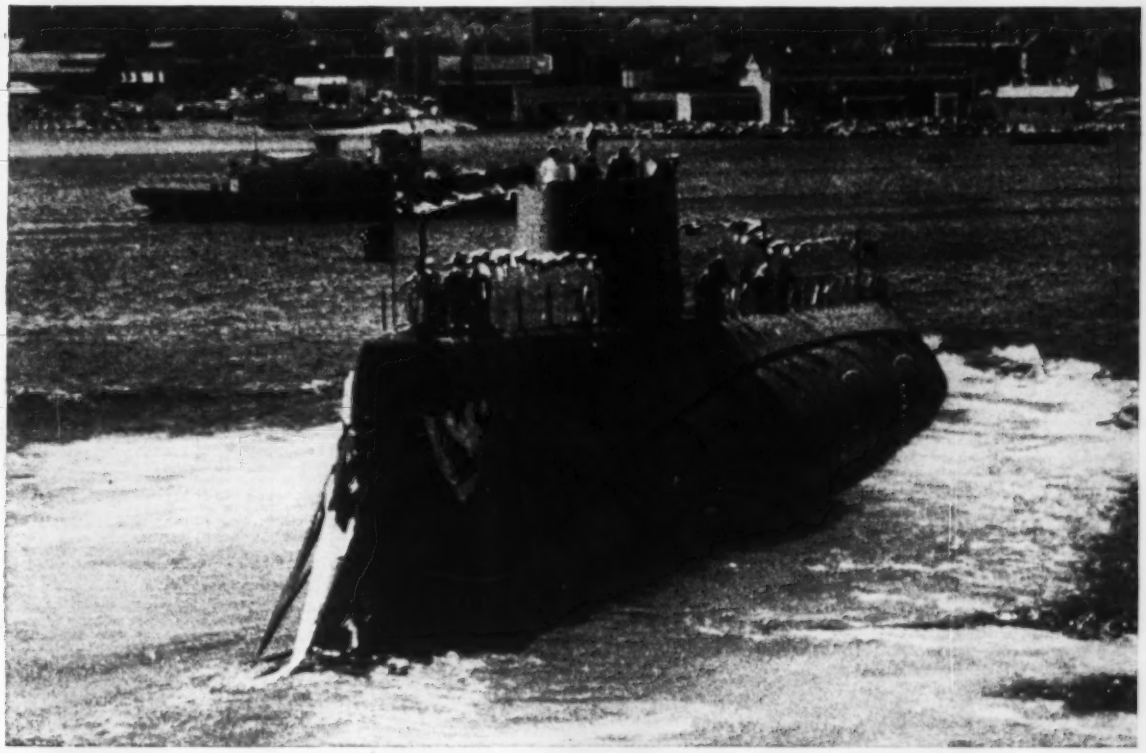
• January production of primary magnesium hit 1877 tons to closely parallel the December output. But it was down substantially from the 5272 tons in January, 1958.

• Domestic uranium ore reserves total 82.5 million tons, reports the Atomic Energy Commission. Currently there are 23 uranium processing mills in operation in the country.

NONFERROUS PRICE RECORD

	Price Mar. 25	Last Change	Previous Price	Feb. Avg	Jan. Avg	Mar., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	31.50–34.00	Mar. 16, 1959	31.50–32.00	30.159	29.212	24.163
Lead	11.30	Mar. 5, 1959	10.80	11.368	12.415	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.25	Mar. 24 1959	102.50	102.364	99.409	93.425
Zinc	11.00	Feb. 25, 1959	11.50	11.409	11.500	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.



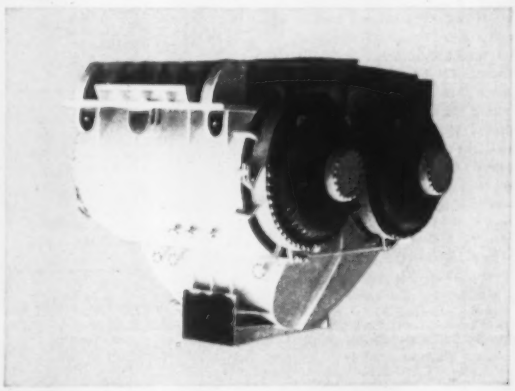
Triton, Navy's Largest Nuclear Sub, Uses Bridgeport Condenser Tubes

Launched in August, 1958, the U.S.S. *Triton* is the biggest, most powerful submarine ever built. With a length of 447 ft. and a displacement of 5,900 tons, *Triton* boasts, among other things, of two engine rooms and two reactor compartments. Built by the Electric Boat Division of General Dynamics Corporation, she is truly a major achievement in naval architecture.

Naturally, *Triton's* equipment must meet the most rigid operating requirements. Helping to fulfill these requirements are Bridgeport Cupro-Nickel condenser tubes in the Allis-Chalmers condenser and air ejector equipment.

Meeting operating demands such as *Triton's* has long been standard practice at Bridgeport. Outstanding operating records have been—and are being—achieved regularly. The experience and knowledge gained from these records can be put to your use—whenever you wish to take advantage of them.

Whatever your needs—simple retubing or other requirements—they are best served, in every respect, by Bridgeport. If you have any problem, question or plans involving heat exchanger equipment, on land or at sea, call your nearest Bridgeport Sales Office. For full details, write direct for the 162-page Bridgeport Condenser Tube Handbook. Write Department 3904.



These twin condenser units were designed and built by Allis-Chalmers. Bridgeport tubes were used throughout.

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY

Bridgeport 2, Connecticut • Sales Offices in Principal Cities

Specialists in Metals from **A***luminum to* **Z***irconium*

Nonferrous Metals

Cents per pound, carlots except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs 24.70; ingots 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 50 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 28.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.70 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.00% Be, $45 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.60 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb (old). **Cobalt:** 97-99%, $1.75 per lb (in 500 lb keg), $1.77 per lb (in 100 lb case), $1.82 per lb (in 1oz 100 lb.

Columbium: Powder, $30.50 per lb, ton.

Copper: Electrolytic, 31.50 (old); custom smelters, 24.00; lake, 31.50 (old); fire refined, 31.50 (old).

Germanium: Pilot reduction, less than 1 kg, $1.00 per gram; 1-10 kg, $7.00 per gram; intrinsic grade, $3.00-5.00 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.8%, $2.50 per troy oz.

Iridium: $10.00 plus per troy oz.

Lead: Common, 11.50; chemical, 11.65; corroding, 11.65; St. Louis New York basis, add 0.10.

Lithium: Cups or ingots, 98-100%, $10 per lb, f.o.b. Minneapolis, 100-500 lb, $6.50 per lb (old).

Magnesium: Pig, 30.00; ingot, 38.00 f.o.b. Painesville, Tex., 1/2 in. sticks, 38.00 f.o.b. Rowlesburg, W. Va.

Magnesium Alloy: AZ31X (remelting), 40.00; AZ63A, AZ91X, AZ92X (sand casting), 44.00, f.o.b. Painesville, Tex.

Mercury: Flasks, 76 lb, New York, $225-230.

Nickel: Electrolytic cathodes, sheet, 4 x 4 in. and larger, regularly produced, 99.90-99.95% grade, 57.00; 99.80% grade, 56.00; 99.50% grade, 55.00; 99.00% grade, 54.00; 97.00% grade, 52.00; 95.00% grade, 50.00; 90.00% grade, 47.00; 85.00% grade, 42.00; 80.00% grade, 37.00; 75.00% grade, 32.00; 70.00% grade, 27.00; 65.00% grade, 22.00; 60.00% grade, 17.00; 55.00% grade, 12.00; 50.00% grade, 7.00; 45.00% grade, 2.00; 40.00% grade, minus 3.00. Prices f.o.b. producers' refineries, Port Colborne, Ont., including import duty. New York basis, add 1.00. Nickel shot, plus 1.00. Nickel oxide sinters, f.o.b. Port Colborne, Ont., including import duty, New York basis, add 1.00. Nickel shot, plus 1.00. Nickel oxide sinters, f.o.b. producers' refineries, New York, or duty equivalent, 2.00 less.

Osmium: $10.00 per troy oz, nom.

Palladium: $20.00 per troy oz, nom.

Platinum: $70.00 per troy oz, nom.

Rhenium: $10.00 per troy oz, nom., depending on quantity.

Rhodium: $90.00 per troy oz, nom.

Ruthenium: $30.00 per troy oz, nom.

Selenium: 99.5% or more, 5.00 per lb, nom., depending on quantity.

Silicon: 98.5% or more, 0.80 per lb, nom., f.o.b. producers' plants.

Silver: Open market, 0.70-0.75, nom., depending on quantity.

Tantalum: Sheet, $80 per lb, nom.; powder, $60 per lb, nom.

Tellurium: $3.00 per lb, nom.

Thallium: $3.00 per lb, nom.

Tin: Straits, 71.50; Malaysian, 71.00; Bolivian, 70.50; Chinese, 70.50; Indonesian, 71.00; Arnalgamating, 71.00; Banka, 71.00; Billiton, 71.00; New York, duty paid, 10,000 lb or more.

Titanium: Sponge, 99.5%, 4.00 per lb, f.o.b. producers' plants, 10,000 lb lots.

Tungsten: Powder, $2.00 per lb, nom.

Uranium: Nominal, $40 per lb, nom.

Vanadium: 98%, $3.50 per lb, f.o.b. producers' plants.

Zinc: Prime western, 13.50; brass special, 13.75; high grade, 14.00; intermediate, 14.25; special high grade, 14.50; extra special, 14.75.

Zirconium: Sponge, 10.00 per lb, nom., f.o.b. producers' plants.

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy, 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. **Steel deoxidizing grades,** notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 32.25; tin bronze, No. 225, 43.25; No. 245, 37.00; high-leaded tin bronze, No. 305, 36.50; No. 1 yellow No. 405, 26.50; manganese bronze, No. 421, 29.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 39.850; l.c.l., 37.45. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 35.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.00 per cwt; pipe, full coils, $17.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.50-17.00; sheet mill plate, $5.70-10.00; wire, $5.70-10.00; forging billets, $3.30-3.75; hot-rolled and forged bars, $4.20-7.50.

ZINC

(Prices per lb, f.o.b. mill.) Sheets, 29.00; rolled zinc in coils, 23.50; plates, 29.00.

ZIRCONIUM

Plate, $12.50-14.50; sq ft, sheet, $12.50-22.00; sq ft, strip, $10.00-33.00; forging or bar, 5, bars, $11.00-17.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	129	109	125
Strip, C.R.	124	105	120
Plate, H.R.	120	103	115
Rod, Shapes, H.R.	107	88	104
Seamless Tubes	137	128	200

ALUMINUM

Sheet, 1100, 3003 and 3004 mill finish, 30,000 lb base, freight allowed.

Producers

Gauge Thickness	Width Inches	Coiled Sheet
.0006-.0007	6.5	50.50-67.50
.0008-.0009	6.5	39.50-46.50
.0010-.0012	6.5	38.50-39.50
.0013-.0017	6.5	39.50-40.50
.0018-.0019	6.5	40.50-42.50
.0020-.0024	6.5	39.50-40.50
.0025-.0029	6.5	40.50-42.50
.0030-.0034	6.5	41.50-42.50
.0035-.0039	6.5	42.50-43.50
.0040-.0044	6.5	42.50-43.50
.0045-.0049	6.5	43.50-44.50
.0050-.0059	6.5	43.50-44.50
.0060-.0069	6.5	44.50-45.50
.0070-.0079	6.5	45.50-46.50
.0080-.0089	6.5	46.50-47.50
.0090-.0099	6.5	47.50-48.50
.0100-.0124	6.5	48.50-49.50
.0125-.0149	6.5	49.50-50.50
.0150-.0174	6.5	50.50-51.50
.0175-.0199	6.5	51.50-52.50
.0200-.0249	6.5	52.50-53.50
.0250-.0299	6.5	53.50-54.50
.0300-.0349	6.5	54.50-55.50
.0350-.0399	6.5	55.50-56.50
.0400-.0449	6.5	56.50-57.50
.0450-.0499	6.5	57.50-58.50
.0500-.0599	6.5	58.50-59.50
.0600-.0699	6.5	59.50-60.50
.0700-.0799	6.5	60.50-61.50
.0800-.0899	6.5	61.50-62.50
.0900-.0999	6.5	62.50-63.50
.1000-.1249	6.5	63.50-64.50
.1250-.1499	6.5	64.50-65.50
.1500-.1749	6.5	65.50-66.50
.1750-.1999	6.5	66.50-67.50
.2000-.2249	6.5	67.50-68.50
.2250-.2499	6.5	68.50-69.50
.2500-.2749	6.5	69.50-70.50
.2750-.2999	6.5	70.50-71.50
.3000-.3249	6.5	71.50-72.50
.3250-.3499	6.5	72.50-73.50
.3500-.3749	6.5	73.50-74.50
.3750-.3999	6.5	74.50-75.50
.4000-.4249	6.5	75.50-76.50
.4250-.4499	6.5	76.50-77.50
.4500-.4749	6.5	77.50-78.50
.4750-.4999	6.5	78.50-79.50
.5000-.5249	6.5	79.50-80.50
.5250-.5499	6.5	80.50-81.50
.5500-.5749	6.5	81.50-82.50
.5750-.5999	6.5	82.50-83.50
.6000-.6249	6.5	83.50-84.50
.6250-.6499	6.5	84.50-85.50
.6500-.6749	6.5	85.50-86.50
.6750-.6999	6.5	86.50-87.50
.7000-.7249	6.5	87.50-88.50
.7250-.7499	6.5	88.50-89.50
.7500-.7749	6.5	89.50-90.50
.7750-.7999	6.5	90.50-91.50
.8000-.8249	6.5	91.50-92.50
.8250-.8499	6.5	92.50-93.50
.8500-.8749	6.5	93.50-94.50
.8750-.8999	6.5	94.50-95.50
.9000-.9249	6.5	95.50-96.50
.9250-.9499	6.5	96.50-97.50
.9500-.9749	6.5	97.50-98.50
.9750-.9999	6.5	98.50-99.50
1.000-1.249	6.5	99.50-100.50
1.250-1.499	6.5	100.50-101.50
1.500-1.749	6.5	101.50-102.50
1.750-1.999	6.5	102.50-103.50
2.000-2.249	6.5

position turnings, 19.25-19.75; new brass clippings, 16.25-16.75; light brass, 13.50-14.00; heavy yellow brass, 14.50-15.00; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 15.75-16.25; cocks and faucets, 16.25-16.75; brass pipe, 16.25-16.75.

Lead: Heavy, 7.50-7.75; battery plates, 3.25-3.50; linotype and stereotype, 8.75-9.25; electrotype, 7.25-7.75; mixed babbitt, 8.75-9.25.

Monel: Clippings, 30.00-32.00; old sheets, 26.00-28.00; turnings, 20.00-23.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 38.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.25; old diecast scrap, 1.50-1.75.

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 6.50-7.00; segregated low copper clips, 13.25-13.75; segregated high copper clips, 13.25-13.75; mixed low copper clips, 12.25-12.75; mixed high copper clips, 11.25-11.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.75-12.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.75-17.25; segregated high copper clips, 15.75-16.25; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.25-15.75.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 13.50-14.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 27.25; light copper, 25.00; refinery brass (60% copper) per dry copper content, 26.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 27.25; light copper, 25.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 18.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 42.50, 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.30; 2000-5900 lb, 13.30; 6000-11,900 lb, 13.05; 12,000-22,900 lb, 12.80; 23,000 lb or more, 12.30.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more 17.80

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 131)

nually, a town to house 3500, a powerplant and other facilities.

Shipments from the new development will supplement high grade ore tonnage moved from the Schefferville area, 140 miles farther north.

Iron Ore Co. of Canada pioneered the shipping of ore from the Quebec-Labrador region, starting in 1954. It moved more than 12 million tons in 1956, and about 7.8 million last year. In addition to the Hanna company, owners are: Republic Steel Corp., Youngstown Sheet & Tube Co., Wheeling Steel Corp., Armco Steel Corp., National Steel Corp., Hollinger Consolidated Gold Mines Ltd., Hollinger North Shore Exploration Co. Ltd., and Labrador Mining & Exploration Co. Ltd.

Another ore project in the area is being developed by Pickands Mather & Co., Cleveland, and affiliated companies (including Youngstown Sheet & Tube Co.) through the Wabush Iron Co. Ltd. The land for this project is leased from Canadian Javelin Ltd. The development program will cost an estimated $250 million.

January Metallics Use Is Highest in Many Months

Stocks of scrap held by consumers at the end of January totaled 8,332,000 gross tons, vs. 8,565,714 at the end of the preceding month. Pig iron stocks totaled 3,465,000 tons, vs. 3,539,526. The figures, reported by the U. S. Bureau of Mines, show that at the end of January, 1958, stocks were: Scrap,

CLASSIFIED ADVERTISING

WANTED

SALES ENGINEER

Midwest chemical company seeks an engineer with production experience as representative for New York-New Jersey area. He shall contact potential customers and make marketing research in protective coatings. These coatings already have a large following throughout the United States. The position will have a good future for the right man. College degree preferred, however, not necessary. Please reply by stating your age, experience, and salary requested.

Address Box 745, STEEL
Penton Bldg. Cleveland 13, Ohio

HELP WANTED

Superintendent to take direct charge of all production equipment in cold roll strip steel mill. Excellent salary. References should include all possible previous job superiors.

Apply to: H. B. Hinman, Jr.
ROME STRIP STEEL CO., INC.
530 Henry Street Rome, N. Y.

Help Wanted

SALESMAN

A major paper converter seeks industrial salesman, tin plate sales experience preferred, to sell diversified product lines to several industries, with 50% of effort on selling packaging to steel producers. Area—Ohio and Western Penna. Attractive salary, expense allowance and bonus programs. State background and salary expectations. Box 748, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, 20 years experience plant layout, design, project planning, specifications, and estimating. Desires heavier responsibilities at plant level. Midwest or far west. Subscribes to policy of full cooperation with operating people. Appropriate principal responses acknowledged. Reply Box 744, STEEL, Penton Bldg., Cleveland 13, Ohio.

—FOR SALE—

1—350 KW GE Motor Generator Set complete with 1-350 KW, 960 cycle, 800 V unity power factor inductor alternator. 500 H.P., 4000/2300 V, 3 P, 60 C, Squirrel Cage induction drive motor with extra leads for dual voltage. I. C.—2609 high frequency generator control panel 350 KW, 960 C, 800 V. NEW—never in use. In original boxes.

Subject to prior sale.

Reply Box No. 746, STEEL
Penton Bldg. Cleveland 13, Ohio

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg; $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 31.50 deld.; custom smelters, 34.00; lake, 31.50 deld.; fire refined, 31.25 deld.

Germanium: First reduction, less than 1 kg, 41.00 per gram; 1-10 kg, 37.00 per gram; intrinsic grade, 35.00-37.00 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 nom. per troy oz.

Lead: Common, 11.30; chemical, 11.40; corroding, 11.40, St. Louis. New York basis, add 0.20.

Lithium: Cups or ingots, 50-100 lb, $10 per lb, f.o.b. Minneapolis; 100-500 lb, $9.50 per lb deld.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, 9Z91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $227-231 per 76 lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.25.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 13.50; No. 2, 14.00; No. 5, 13.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy, 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 32.25; tin bronze, No. 225, 43.25; No. 245, 37.00; high-leaded tin bronze, No. 305, 36.50; No. 1 yellow No. 405, 26.50; manganese bronze, No. 421, 29.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.855; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.00 per cwt; pipe, full coils, $17.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.50-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; not-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circle: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam, 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ¾ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-75	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 25.25-25.75; No. 2 heavy copper and wire, 23.25-23.75; light copper, 21.25-21.75; No. 1 composition red brass, 20.25-20.75; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	55.63b	52.86c	....	55.82
Yellow Brass	48.24	32.73d	48.78	51.65
Low Brass, 80%	51.23	51.17	51.77	54.54
Red Brass, 85%	52.29	52.23	52.83	55.60
Com. Bronze, 90%	53.90	53.84	54.44	56.96
Manganese Bronze	56.54	50.14	60.62	....
Muntz Metal	50.85	46.16	....	....
Naval Brass	52.80	46.61	59.36	56.21
Silicon Bronze	60.67	59.86	60.21	78.35
Nickel Silver, 10%	63.82	66.15	66.15	....
Phos. Bronze	75.34	75.84	75.84	77.02

SCRAP ALLOWANCES e (Based on copper at 31.50c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	27.500	27.500	26.750
Yellow Brass	20.625	19.750	18.750
Low Brass, 80%	23.250	23.000	22.500
Red Brass, 85%	24.250	24.000	23.500
Com. Bronze, 90%	25.125	24.875	24.375
Manganese Bronze	19.125	18.875	18.375
Muntz Metal	19.375	19.125	18.625
Naval Brass	19.125	18.875	18.375
Silicon Bronze	27.000	26.750	26.000
Nickel Silver, 10%	26.500	25.250	12.625
Phos. Bronze	28.625	28.375	25.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 19.25-19.75; new brass clippings, 16.25-16.75; light brass, 13.50-14.00; heavy yellow brass, 14.50-15.00; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 15.75-16.25; cocks and faucets, 16.25-16.75; brass pipe, 16.25-16.75.

Lead: Heavy, 7.50-7.75; battery plates, 3.25-3.50; linotype and stereotype, 8.75-9.25; electrotype, 7.25-7.75; mixed babbitt, 8.75-9.25.

Monel: Clippings, 30.00-32.00; old sheets, 26.00-28.00; turnings, 20.00-23.00; rods, 30.00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 38.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.25; old diecast scrap, 1.50-1.75.

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 6.50-7.00; segregated low copper clips, 13.25-13.75; segregated high copper clips, 13.25-13.75; mixed low copper clips, 12.25-12.75; mixed high copper clips, 11.25-11.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.75-12.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.75-17.25; segregated high copper clips, 15.75-16.25; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.25-15.75.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 13.50-14.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 27.25; light copper, 25.00; refinery brass (60% copper) per dry copper content, 26.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 27.25; light copper, 25.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 18.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 42.50, 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.30; 2000-5900 lb, 13.30; 6000-11,900 lb, 13.05; 12,000-22,900 lb, 12.80; 23,000 lb or more, 12.30.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more 17.80

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 131)

nually, a town to house 3500, a powerplant and other facilities.

Shipments from the new development will supplement high grade ore tonnage moved from the Schefferville area, 140 miles farther north.

Iron Ore Co. of Canada pioneered the shipping of ore from the Quebec-Labrador region, starting in 1954. It moved more than 12 million tons in 1956, and about 7.8 million last year. In addition to the Hanna company, owners are: Republic Steel Corp., Youngstown Sheet & Tube Co., Wheeling Steel Corp., Armco Steel Corp., National Steel Corp., Hollinger Consolidated Gold Mines Ltd., Hollinger North Shore Exploration Co. Ltd., and Labrador Mining & Exploration Co. Ltd.

Another ore project in the area is being developed by Pickands Mather & Co., Cleveland, and affiliated companies (including Youngstown Sheet & Tube Co.) through the Wabush Iron Co. Ltd. The land for this project is leased from Canadian Javelin Ltd. The development program will cost an estimated $250 million.

January Metallics Use Is Highest in Many Months

Stocks of scrap held by consumers at the end of January totaled 8,332,000 gross tons, vs. 8,565,714 at the end of the preceding month. Pig iron stocks totaled 3,465,000 tons, vs. 3,539,526. The figures, reported by the U. S. Bureau of Mines, show that at the end of January, 1958, stocks were: Scrap,

CLASSIFIED ADVERTISING

WANTED

SALES ENGINEER

Midwest chemical company seeks an engineer with production experience as representative for New York-New Jersey area. He shall contact potential customers and make marketing research in protective coatings. These coatings already have a large following throughout the United States. The position will have a good future for the right man. College degree preferred, however, not necessary. Please reply by stating your age, experience, and salary requested.

Address Box 745, STEEL
Penton Bldg. Cleveland 13, Ohio

HELP WANTED

Superintendent to take direct charge of all production equipment in cold roll strip steel mill. Excellent salary. References should include all possible previous job superiors.

Apply to: H. B. Hinman, Jr.
ROME STRIP STEEL CO., INC.
530 Henry Street Rome, N. Y.

Help Wanted

SALESMAN

A major paper converter seeks industrial salesman, tin plate sales experience preferred, to sell diversified product lines to several industries, with 50% of effort on selling packaging to steel producers. Area—Ohio and Western Penna. Attractive salary, expense allowance and bonus programs. State background and salary expectations. Box 748, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, 20 years experience plant layout, design, project planning, specifications, and estimating. Desires heavier responsibilities at plant level. Midwest or far west. Subscribes to policy of full cooperation with operating people. Appropriate principal responses acknowledged. Reply Box 744, STEEL, Penton Bldg., Cleveland 13, Ohio.

—FOR SALE—

1—350 KW GE Motor Generator Set complete with 1-350 KW, 960 cycle, 800 V unity power factor inductor alternator. 500 H.P., 4000/2300 V, 3 P, 60 C, Squirrel Cage induction drive motor with extra leads for dual voltage. I. C.—2609 high frequency generator control panel 350 KW, 960 C, 800 V. NEW—never in use. In original boxes.

Subject to prior sale.

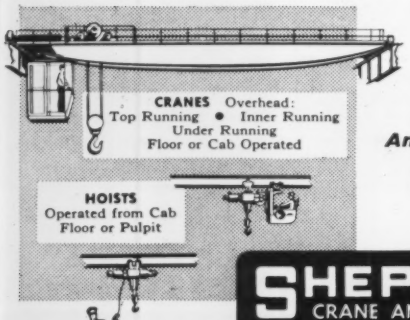
Reply Box No. 746, STEEL
Penton Bldg. Cleveland 13, Ohio

SHEPARD NILES

INDUSTRIAL CRANES

TALK TO SHEPARD Niles first when you're considering a medium capacity crane. Because Shepard offers a wide range of standardized cranes for your selection . . . including welded plate girders for longer spans; Shepard's widely-praised welded I beam design for shorter spans; geared or direct drive trucks; Shepard's distinctive crane trolley (not hoist type); cab or floor operated; manual or magnetic control.

These Shepard Niles Cranes can be rated and applied for light, medium or heavy service. All component parts are designed and built by us expressly for crane service.



• Write for Bulletin illustrating Shepard Niles medium capacity cranes . . . ask to have a representative call at your convenience.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
2385 Schuyler Ave., Montour Falls, N. Y.

7,951,498 tons; pig iron, 3,469,969 tons.

Domestic consumption (scrap and pig iron) during January totaled 10,984,000 tons, of which 49 per cent was scrap (5,374,000 tons), and 51 per cent was pig iron (5,374,000). Scrap use was the largest for any month since June, 1957, while pig iron consumption was the highest since October, 1957.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5700 tons, superstructure, Martinsville Bridge, Ohio River, Wetzel County, W. Virginia, to Mount Vernon Bridge Co., Mt. Vernon, Ohio.

3700 tons, for a $7.5 million warehouse at Lansing, Mich., for Oldsmobile Div., General Motors Corp., to R. C. Mahon Co., Detroit.

2200 tons, bridge components (estimated), U. S. Engineer, Chicago, to the Marinette Marine Corp., Marinette, Wis.

800 tons, fiber drum plant, Continental Can Co., Carteret, N. J., through Walter Kidde Constructors Inc., 140 Cedar St., New York, to Elizabeth Iron Works, Union, N. J.

325 tons, wide flange, General Stores Supply Office, Navy, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, five span stringer bridge, Swansea, Mass., to Tower Iron Works, Providence, R. I.; S.&M. Construction Co., Providence, general contractor.

176 tons, brewhouse, Olympia Brewing Co., Olympia, Wash., to Isaacson Iron Works, Seattle.

175 tons, angles, General Stores Supply Office, Navy, Philadelphia, to Knoxville Iron Co., Knoxville, Tenn.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, Oregon State highway projects, Benton, Josephine, Union, and Yamhill counties, to unstated interests.

565 tons, office building, American Chemical Society, Washington, D. C., to Ceco Steel Products Co., Clifton, N. J.; William P. Lipscomb Construction Co., Washington, is general contractor.

510 tons, home for the aged, Bridgeport Diocese, Trumbull, Conn., to Fireproof Products Co., New York; E.&F. Construction Co., Bridgeport, Conn., general contractor.

300 tons, including structurals, North End High School, Stratford, Conn., to Fox Steel Co., Orange, Conn. (reinforcing), and Connecticut Steel Co., New Haven, Conn. (structurals); E.&F. Construction Co., Bridgeport, Conn., general contractor.

200 tons, including structurals, research laboratory, Martin Co., Littleton, Colo., to Colorado Builders Supply Co. (reinforcing), and Burkhardt Steel Co., Denver (structurals); Mead & Mount Construction Co., Denver, general contractor.

175 tons, junior high school, North Haven, Conn., to Standard Structural Steel Co., Hartford, Conn.; P. Francini & Co. Inc., Derby, Conn., general contractor.

100 tons, five span stringer bridge, Swansea, Mass., to Northern Steel Inc., Boston; S.&M. Construciton Co., Providence, R. I., general contractor.

RAILS, CARS . . .

RAILROAD CARS PLACED

Baltimore & Ohio, 500 seventy-ton gondolas, to own shops at DuBois, Pa.; of the total, 100 will be especially fitted for handling coil steel, another 50 for bar steel, and ten for tin plate. This contract follows an order placed with the DuBois shops for 500 fifty-ton hoppercars.

Chicago & Great Western, 10 seventy-ton hoppercars to Pullman-Standard Car Mfg. Co., Chicago.

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MUNDT

PERFORATED METAL MEANS PERFECT SCREENS

Specially Fabricated for ALL INDUSTRIES BY

CHARLES MUNDT & SONS

53 FAIRMOUNT AVE.
JERSEY CITY 4, N. J.
PHONE—DELAWARE 3-6200

Send for Illustrated Catalog

Check your AIM*... Standard Railway Equipment does...

Pneumatic tools speed unitizing operation

STANDARD RAILWAY EQUIPMENT MANUFACTURING COMPANY, HAMMOND, INDIANA, uses pneumatic stretchers to unitize freight car roof sections. Their Acme Idea Man suggested to this leading company that pneumatic stretchers would increase the speed and efficiency of the strapping operation. (Idea U6-20)

Acme Idea Man Andy Bassi helped develop a better unitizing method.

The pneumatic stretchers provide effortless, continuous strapping takeup to a pre-set, uniform tension. By tensioning steel strapping simultaneously around both ends of the units of roof sections, greater compression of the units can be obtained, enabling three of them to be loaded across the width of a gondola car. Strapping is used directly from the coil rather than in cut lengths, eliminating waste. The men find strapping quicker and easier to apply. Shipments move out of the plant faster, and arrive at their destination in excellent condition.

***Check Your Acme Idea Man.** His fund of knowledge may be what you need to help solve your materials handling or shipping problem. Call him at your nearest Acme Steel Office. Or write Dept. SDU-39, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 3, Ontario.

ACME STEEL **STEEL STRAPPING**

These incomparable annealing results prove

LEE WILSON'S OPENED COIL METHOD BEST!

Those familiar with annealing will recognize the chart below as an outstanding example of controlled uniformity in annealing.

This large 13-ton coil was subjected to 90 tests after it had been annealed in just 7¼ hours. From inside to outside Rockwell variance was held to an amazingly low three points.

This is not the exception, but rather the rule when steel is annealed by the new Opened Coil method developed and perfected by Lee Wilson engineers. Two pilot plants—one for tinplate and one for carbon steels—are now under construction—will soon be placed in operation in two of America's leading steel plants.

TABLE 1

SUMMARY PHYSICAL TESTS, METALLURGICAL TEST

SIZE: .0359" x 42¼" x 76¼"

PART: EXTERIOR DOOR PANEL

Weight 26,900 — Al-Killed Steel

		Outside as Annealed					Center		Inside as Annealed				
		1	2	3	4	5	6	7	8	9	10	Average	Range
ROCKWELL HARDNESS	E_1	43	44	43	44	44	43	43	43	44	44	43.5	43/44
	C	44	42	42	43	44	43	43	44	44	43	43.2	42/44
	E_2	43	42	44	44	44	42	42	44	45	44	43.4	42/45
OLSEN DUCTILITY	E_1	415	415	420	420	420	420	420	415	415	415	417.5	415/420
	C	410	415	415	425	420	420	415	420	415	415	417.0	410/425
	E_2	410	415	420	425	415	415	415	415	415	420	416.5	410/425
MICRO GRAIN SIZE	E_1	6	6/7	6/7	6/7	7	7	7/8	7/8	7	7/8	.....	.....
	C	6/7	6/7	6/7	6/7	7/8	7/8	7/8	7/8	7/8	7/8	.....	.....
	E_2	6/7	6/7	6	6/7	7/8	7/8	7	7	7	7		

		L	T	L	T	L	T
TENSILE RESULTS	Yld. Str. (psi)	27,540	27,780	26,460	27,010	26,750	27,780
	Tens. Str. (psi)	44,910	45,290	45,760	45,210	46,680	47,050
	% Elong. (2")	40.0	39.0	40.0	38.0	39.0	39.0

Opened coil being rewound into a tight coil after annealing by Lee Wilson's patented coil handling system.

Lee Wilson ENGINEERING COMPANY, INC.

HIGH PRODUCTION ANNEALING SYSTEMS

MAKE THE BEST METALS BETTER

ORIGINATORS AND LEADING PRODUCERS OF OPENED COIL AND SINGLE-STACK FURNACES

WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by MESTA

MESTA
THERE IS NONE BETTER

MESTA Universal Structural Mill rolling wide flange beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA